

**ENVIRONMENTALLY
PREFERABLE
PURCHASING

RESOURCE MANUAL**



October 2002

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Welcome to the National Park Service Environmentally Preferable Purchasing Manual

We are convinced that developing and installing an environmentally preferable purchasing program (EPP) in our parks is one of the most effective steps we can take to ensure their future.

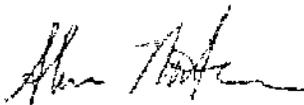
The National Park Service buys roughly \$1.4 billion of goods and services every year, and NPS concessionaires add to this sum. These purchases have a significant impact on the 84 million acres the NPS is charged with protecting. And NPS staff is eager to buy environmentally preferable products. Indeed, concern for the environment is the very reason that many of you joined the Service. NPS concessionaires present another opportunity to protect the environment, for the concessionaires have a vested interest in protecting the parks that are essential for their commercial success. What's more, a host of laws, executive orders, and regulations direct us to consider the environment in purchasing goods and services.

Most important, however, are the park's 270 million annual visitors who offer a receptive audience for lessons in environmentally preferable purchasing and a potential corps of missionaries for its practice.

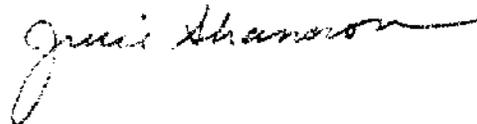
Mission, committed employees, concessionaires, mandates, and responsive visitors all make the national parks an ideal venue for a successful environmentally preferable purchasing program.

The tools in this manual will make it a lot easier to execute EPP. With your help, the national parks can be a model for the entire country.

Let's do it!



Shawn Norton
Environmental Leadership
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National Park Service



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CHOOSE GREEN REPORTS

Green Seal is a twelve year old, nonprofit, 501(c)(3) environmental organization with the mission of obtaining significant environmental improvement by encouraging the manufacture and purchase of environmentally preferable goods and services. Green Seal is the only organization in the country that recommends environmentally responsible manufactured products from a life cycle point of view. Green Seal meets EPA's Criteria for Third Party Certifiers, operates under ISO 14020 and 14024, and is the U.S. member of the Global Ecolabeling Network, the international harmonizing body for ecolabeling programs.

In preparing *Choose Green Reports* Green Seal investigates the category through talks with manufacturers, trade associations, users, governments, academics, other authoritative sources and by consulting the literature. They then develop environmental criteria for the category that take a life cycle approach and prepare a list of national manufacturers. The manufacturers are surveyed to determine brands and models that meet the criteria. Green Seal then recommends specific brands and models that do. Green Seal reviews the data on the recommended products with the manufacturers who provided it to ensure accuracy. A peer panel reviews the *Choose Green Report* before publication.

The *Reports* recommend specific brands that, based on their manufacturers statements, meet criteria for environmental preferability. You can simply ask your supplier for prices on the ones you're interested in. That's how easy doing EPP can be.

Choose Green Reports presented here:

- Carpet
- Compact Fluorescent Lighting
- Copy Paper
- Industrial and Institutional Cleaners
- Lawn Care Equipment
- Occupancy sensors
- Paints
- Paper towels
- Particleboard and Medium-density Fiberboard
- Printing and writing paper
- Rigid Quick Serve Food Packaging
- Room Air Conditioners

GREEN REPORT

GREEN SEALS
Choose

CARPET

We walk on carpet almost every day—yet the appealing colors and patterns and the cushioning comfort it provides are often taken for granted. We notice when it's worn or soiled, but we seldom, if ever, think about how this ubiquitous product is made, how it affects indoor air quality during use, and what happens to it when it is discarded and replaced. Fortunately, the carpet industry has been doing some serious thinking about the complex environmental choices among carpet materials, production processes, and recycling opportunities and offers an array of products that represent greener choices.



Carpet is usually made from synthetic fibers, such as nylon, which are produced from petroleum, a non-renewable resource. Petrochemical processes for synthetic fiber production require high inputs of energy and water and produce harmful air emissions (hazardous air pollutants and volatile organic

Carpet sent to landfills each year covers an area greater than New York City.



compounds (VOCs) that contribute to smog). Carpet production itself is energy and water intensive, and toxic dyes have been used to produce the attractive colors we demand, which sometimes end up in streams. Carpet has also been identified as a contributor to indoor air pollution, particularly from adhesives used for installation. Finally, old carpet has been typically disposed of in landfills, taking up valuable landfill space and wasting resources that could be reused or recycled. The carpet industry continues to address each of these major environmental impacts with different approaches depending on the company and the type of carpet being manufactured.

INDUSTRY FACTS

- Over **1.9 billion square yards** of carpet were produced in the United States in 1999. This is nearly **5 million tons** (based on an average of 5 pounds per square yard).
- The carpet industry currently uses an average of **10.1 gallons of water per square yard of carpet** produced.
- The average **energy use is 23,000 British Thermal Units (BTUs)** per square yard of carpet produced.
- Approximately **2.44 million tons** of old carpet were **landfilled** in 1999. The carpet waste generated in just one year at the current level, if laid flat on the ground, would be **more than enough to completely cover New York City**.

There are around 240 carpet manufacturing plants currently operating in the U.S. located in 21 states. Of these, about 174 plants are located within a 65-mile radius of Dalton, Georgia, which is known as the "Carpet Capital" of the

world. The total industry sales in 1999 were approximately \$12 billion. The United States supplies 45% of the world's carpet. Of the total carpet market, 74% is residential and 26% commercial.

The **Choose Green Report** is published for Green Seal Environmental Partners. To become an Environmental Partner, or to receive a copy of this report, contact Green Seal at (202) 872-6400 or greenseal@greenseal.org.

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Putting It All Together

Mostly Tufted

The two main types of carpet produced in the U.S. are tufted and woven, with tufted accounting for most of the production (more than 90%). Tufting is a process that grew out of the chenille bedspread industry and involves using a series of needles to insert loops of pile yarn into a primary backing, which is commonly made of polypropylene. The loops are secured to the primary backing with an adhesive compound, typically styrene butadiene rubber (SBR), or other chemical binders. Most carpet products have a secondary backing of polypropylene for increased strength and stability and may have a synthetic foam cushion attached. Secondary backings are typically attached using smaller

amounts of SBR. Woven carpets are made on huge looms by taking the face and backing yarns together and weaving them into a thick fabric. A latex coating is usually applied to the underside to impart stability.

On the Face of It

Face fiber is used to produce the pile yarn, which is tufted or woven to form the carpet pile. Over 3.5 billion pounds of face fiber are consumed each year by the carpet manufacturing industry. The largest manufacturer alone uses over 2 million pounds of face fiber a day. The face fiber is predominantly made from synthetic materials (such as nylon,

TILES VS. BROADLOOM

Carpet is produced in two forms: broadloom (typically 6- and 12-foot width rolls) and modular tiles. Carpet tile is carpet that has been processed into squares, usually 17"x17" or greater. This type of floorcovering allows for easy access to the subfloor, unique designs on the floor, and ease of storage as it is shipped in cartons usually containing 20 tiles each. Tiles use more material initially because of the need for a thicker backing but, in the long run, the use of modular tiles can save materials because worn or soiled tiles can be replaced individually instead of replacing the whole carpet.

olefins, and polyester) in the U.S. today, with carpets made from natural fibers (mostly wool, which is more costly than any of the synthetic fibers) representing only a small percentage of total production. Other natural fibers used in very small quantities include cotton, sisal, jute, hemp, and coir.

Backing It Up

While polypropylene is predominantly used as the primary and secondary backing material for carpet, some non-woven materials may be used as primary backing for carpet tiles. Jute is sometimes used as primary backing in woven woolen carpets. The binders used for attaching primary and secondary backings are synthetic rubber (SBR latex), polyurethane, polyvinyl chloride (PVC), and ethylene vinyl acetate (EVA). The backing can contribute up to 60% of the carpet material by weight.

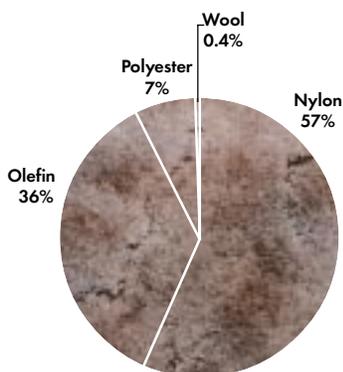
How Green Is My Carpet?

Fibers Are a Mixed Bag

Both synthetic and natural fibers have their advantages and drawbacks, and both create different types of environmental impacts. In the case of synthetic fibers, the manufacturing impacts, such as energy use and air emissions generated prior to carpet making, are typically more significant. All synthetic fibers are petroleum-based and, for that reason, they



MARKET SHARE BY FIBER TYPE



bring with them the environmental impacts associated with petroleum exploration and refining. Petroleum is a non-renewable resource, and using it to produce synthetic fibers requires large amounts of energy and generates considerable pollution. On the other hand, agricultural impacts (and grazing impacts in the case of sheep's wool) result from use of natural fibers. Wool also involves the use of water and energy for washing, and water pollution and solid wastes are generated from the wool-washing process. Additionally, methane releases from sheep could contribute to global warming. Wool, however, is a renewable resource and requires less energy to produce than synthetics.

- Nylon is the most commonly used synthetic fiber for carpets. It is durable, can be easily cleaned, is lightweight, and has a good texture. Two closely related forms of nylon (nylon 6 and nylon 6,6) are used in carpet facing. Some manufacturers believe that nylon 6,6 offers better performance characteristics, such as stain resistance. From

an environmental standpoint, nylon requires high energy to produce, and its production involves the precursors benzene (a known human carcinogen, for nylon 6) and hydrogen cyanide gas (which is extremely poisonous, for nylon 6,6). The manufacturing of nylon releases volatile organic compounds (VOCs), nitrogen oxides and ammonia.

- Olefins, such as polypropylene, are generally less expensive, require less energy to produce than other synthetic fibers typically used in carpets, have good color-fastness and tend to generate less static electricity than other fibers. While polypropylene is quite durable, its drawbacks include less texture retention and less resilience than nylon.
- Polyester (polyethylene terephthalate—PET) is another fiber used for making carpets. It's not as durable as nylon and, therefore, is best suited for use in light or medium traffic areas only. The major environmental advantage of PET is that it can be manufactured from post-consumer recycled plastic packaging (soft drink bottles), thus providing an end product with a high recycled content.

Purchasers should select the carpet fiber best suited for their applications. Wool makes an excellent choice when price is not a major concern. Nylon can be used for heavy-duty, high-traffic applications. Olefins can be used where texture and resilience are not as critical. And polyester should be considered for light-to-medium traffic applications.

Toxics Lurk Behind

All synthetic backing materials used in carpet manufacturing have known environmental drawbacks. PVC, a commonly used backing material, is produced from vinyl chloride monomer, a potent human carcinogen. PVC contains stabilizers, such as lead (a toxic metal), and also contains plasticizer chemicals (usually phthalates) that may be released into the indoor environment throughout the life of the carpet. Moreover, if carpets are incinerated for energy recovery, PVC backing can release dioxins, compounds that are potent carcinogens and can cause immune system damage. PVC, however, can be recycled into new vinyl carpet backing through existing programs.

The manufacture of synthetic rubber (styrene butadiene rubber or SBR) involves toxic chemicals such as polystyrene and 4-phenylcyclohexene (4-PC), a by-

product with a very low odor threshold. The production of polyurethane, another commonly used backing material,

involves the use of methylenediphenyl isocyanate (MDI), which could be hazardous for workers, although controls to prevent exposure are generally in place. MDI can cause dermatitis and respiratory diseases in workers and may alter the immune system, resulting in sensitization of the respiratory system and asthma-like reactions. MDI is not considered a carcinogen in humans, however, and does not present an exposure risk in the finished carpet products. There are no current commercial-scale recycling processes for polyurethane-backed carpet, but recycling options exist for polyurethane padding.

Carpets, by nature, trap dust, dirt, fumes, and other contaminants.

reduction in the average quantity of water consumed per square yard of carpet from 14.1 gallons to 10.1 gallons in the last four years. Because energy use and wastewater release have been issues of environmental concern for carpet mills for a long time, these are major focus areas for environmental improvements by the industry.

Dyeing methods such as solution dyeing are less burdensome to the environment and should be preferred. Solution dyeing is a process in which color is added to the molten polymer solution from which the fibers are extruded. Solution dyeing does not involve any aqueous dye solutions or drying steps, thereby considerably reducing the amount of energy and water usage that is typically associated with vat dyeing. Moreover, solution-dyed nylon has better color fastness and improved resistance to cleaning chemicals, including dilute bleach.

RECYCLED CONTENT DEFINITIONS

Post-Consumer: A material or finished product that has served its intended use and has been diverted or recovered from waste destined for disposal, having completed its life as a consumer item.

Post-Industrial: Materials generated in manufacturing and converting processes, such as manufacturing scrap and trimmings/cuttings, that have been recovered or diverted from solid waste.

Solutions To Dye For

Dyeing (by wet methods) is inherently an environmentally burdensome process. Though the chemicals used differ from process to process and fiber to fiber, the benzidine-based azo dyes in particular are considered carcinogenic. Carpet dyeing by wet methods consumes huge amounts of energy and water and involves wastewater and dye releases to the environment. Steam fixing and drying of the carpet is highly energy-intensive, while wastewater is generated mainly from spent dye solutions and washing. According to industry reports, carpet manufacturers are constantly finding ways to reduce water usage, resulting in a

Taking the Breath Away

Air pollution within the home or workplace has assumed greater significance as buildings became more airtight to improve energy efficiency. Carpets, by nature, trap dust, dirt, fumes, and other contaminants. Proper vacuuming is necessary to remove dust and other contaminants from the carpet for better indoor air quality as well as longer carpet life. Moreover, the chemical makeup of the carpet assembly can release Volatile Organic Compounds (VOCs) for 48 to 72 hours after installation. Adhesives, seam sealants, and carpet padding all contribute to VOC off-gassing, but adhesives are generally the largest

source of VOCs. To address these concerns and to identify carpet products that are truly low-VOC, the Carpet and Rug Institute (CRI) has established a labeling program. The “green label” CRI Indoor Air Quality Carpet Testing Program for carpets assures the consumer that the product has been tested and meets the criteria for low emissions.

The current criteria for the CRI green label, which appear below, are based on maximum allowable emission factors for finished carpet, adhesives, and cushion.



Pollutant	Carpet mg/m ² -hr	Adhesive mg/m ² -hr	Cushion mg/m ² -hr
2-Ethyl-1-Hexanol		≤ 3.0	
4-PC (4-Phenylcyclohexene)	≤ 0.05		≤ 0.05
BHT (Butylated hydroxytoluene)			≤ 0.3
Formaldehyde	≤ 0.05	≤ 0.05	≤ 0.05
Styrene	≤ 0.4		
Total Volatile Organic Compounds	≤ 0.5	≤ 10.0	≤ 1.0

Note: Formaldehyde is not used in carpet or adhesives, but levels are tested to demonstrate that formaldehyde is not an issue in carpets (Source: CRI).

In the past, volatile organic solvents have been used to emulsify or liquefy the bonding resin in adhesives. More recently, manufacturers have begun using heat instead of volatile solvents to emulsify their resin. Some manufacturers now sell low-VOC products, and some claim to have reduced VOCs to zero. Adhesives are primarily used in commercial, not residential, installation. Some products, like “peel and stick” carpet tiles, do not require an additional application of adhesives during installation, which reduces the amount of off-gassing that occurs at the installation site. Green Seal’s consensus standard for industrial adhesives calls for VOC levels of no more than 150g/l for flooring adhesives.

Getting In the Loop

Few reuse and recycling options have traditionally existed for carpet. Though high enough in BTU value, carpet’s bulky nature and the associated high transportation costs make it a poor candidate for waste-to-energy incineration. As a result, more than 2 million tons of carpet are landfilled in the U.S. each year. However, there are some additional options available now to keep carpet out of landfills altogether or, at least, to

*Buy
refurbished
carpet whenever
possible.*

extend the time before it is landfilled. Problems that affect the viability of reuse and recycling of carpet are the costs of collection, sorting, and transportation to the reuse or recycling facility. Sorting carpet by material for recycling has been facilitated by the development of instruments for automated determination of material content.

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Make It As Good As New

Carpet is often replaced for aesthetic reasons, because it “looks” old or has lost its “new” appeal. Refurbishment involving cleaning and re-dyeing gives carpet a new lease on life. Milliken Carpet is one company that takes back its modular carpet tiles and, through its “Earth Square” process, restores them to “like new” condition. The process involves super-heated cleaning, retexturing, and re-

design. The reconditioned tiles cost 40–45% less than new ones and come with a 10-year warranty. Good quality used carpet can also be sold or donated to charities rather than being discarded.

Carpet tiles make it easy to renew areas of worn or soiled carpet, extending the life of the overall floorcovering.

Lease and Use Less

Carpet leasing programs that result in the carpet being brought back to the manufacturer at the end of its life may increase the refurbishment, reuse, and recycling of carpet. If environmental benefits are of interest to the consumer, the manufacturer should be queried in order to ensure that this is an intended result of such a program. A company that leases “carpet service” by the square foot is Interface, through its Evergreen Lease program. The worn-out tiles are replaced and taken back by Interface for recycling. This ensures that, for a monthly lease fee, the customer will have good carpet all the time. Most other carpet companies can offer leasing options for their products, though at this time, many are strictly financing options that have little impact on the management of end-of-life carpet.

Closing the Loop Is Best

“Carpet-to-carpet” is considered the best form of recycling because the resources and energy used to manufacture the original carpet are utilized again to produce new carpet that lasts another lifetime, instead of being wasted. But

recycling does not come without its own environmental burdens. The particular recycling process used dictates the amount of energy consumed to convert the material back into a usable form. Not enough data are available to compare specific recycling processes, but closed-loop recycling in general is preferable because it avoids a number of initial steps (extraction and materials processing) required to prepare the material for use in carpet manufacture.

There are two forms of closed-loop recycling: chemical recycling and materials recycling. In chemical recycling the nylon face fiber is physically or chemically separated from the backing and other materials and then subjected to a depolymerization process to convert it back into caprolactam, the monomer from which it was made. The caprolactam can then be used to make fresh nylon 6, making it an almost infinitely renewable nylon resin system. BASF is the only company that currently recycles nylon 6. BASF collects and recycles carpets through its own “6ix Again” program. BASF accepts any end-of-life product bearing the 6ix Again back stamp at no charge and, after shaving the nylon 6 face fiber off, recycles it through its patented recycling process. Honeywell (formerly Allied Signal), through a joint venture called Evergreen Nylon Recycling located in Augusta, GA, manufactured the “Infinity” brand recycled nylon 6.

The plant had the capacity to keep up to 200 million pounds of nylon 6 waste out of U.S. landfills each year. According to recent reports, however, higher-than-expected production and development costs combined with current business and economic conditions forced the plant to temporarily suspend operations in September 2001. It will remain closed for an indefinite period of time.

While Nylon 6 has been the only type of nylon that could be recycled so far, Solutia Inc. has developed a closed-loop process to recycle nylon 6,6 from post-industrial materials (under the



brand name *Ultron Renew*). This fiber is currently being used by carpet manufacturers, including Interface (in its “Sabi” collection).

In closed-loop materials recycling, carpet materials are recycled into new carpet through mechanical and thermal processes without changing the chemical form of the materials. The “Infinity Initiative” of Collins and Aikman Floorcoverings (C&A) involves recycling old carpet into new carpet backing. Used vinyl-backed carpet is collected, reduced to small pellets, mixed with post-industrial carpet waste, and re-extruded to form a 100% recycled

carpet tile backing. Some materials suppliers incorporate post-industrial recycled content into the nylon fibers they produce (e.g., Solutia Inc., Dupont).

Recycle Down If Need Be

If reuse or closed-loop recycling are not possible, the next alternative is to recycle the carpet materials into other applications and products. This process is called “open-loop recycling” or “downcycling.” One example is the DuPont Carpet Reclamation program. Begun in 1990 by DuPont, the company that invented nylon, the program accepts carpet of any type for melt-processing into automobile parts, industrial flooring, soundproofing material, soil enhancement material, and padding. The program has a large number of reclamation locations throughout the country where installers can drop off used carpet at a cost comparable to that of landfilling.

Buy Recycled

In addition to recycling post-consumer carpet to the maximum extent possible, it is also desirable to use recycled content to manufacture it in the first place. Closed-loop recycling automatically ensures that recycled content is used, but there are certain varieties of carpet that can be made either completely from, or incorporate a high content of, post-consumer or post-industrial recycled material. An example is the polyester carpet



Two cases of soft drink bottles diverted from the waste stream will make a square yard of polyester carpet.

“Envirelon” made from PET soda pop bottles diverted from the waste stream by Talisman Mills. It takes about two cases of recycled bottles to make a square yard of carpet.

NATIONAL AGREEMENT FOR CARPET STEWARDSHIP

After two years of dialogue and work by industry, state and federal government, and environmental groups, a national agreement on carpet stewardship has been signed. This agreement is the first voluntary, multi-stakeholder product stewardship in the United States. It commits the signatories to achieving a landfill diversion goal of 40% by 2012, to be accomplished primarily through increased reuse and recycling of post-consumer carpet. To meet the goals of the agreement, the carpet industry has already established a third-party organization, called the Carpet America Recovery Effort (CARE). In addition to responsibility for meeting the goals, CARE will help develop the collection infrastructure for carpet and will develop and perform quantitative measurement and reporting requirements on progress towards the goals.

POWERBOND ER3

Collins and Aikman (C&A) Floorcovering’s Powerbond ER3 modular tiles come with a 100% recycled content backing and are available with the company’s low VOC “peel and stick” adhesive system. The products contain between 31–50% overall recycled content (depending on the style), of which a minimum of 23% is material from recycled carpet, 7% of which is post-consumer. C&A has a carpet collection/ recovery system and a currently operational, commercial-scale, recycling process to recycle vinyl-backed carpet. C&A can recycle any vinyl-backed carpet regardless of the original manufacturer. Carpet recycled in the process is used to produce ER3, 100% recycled content carpet backing. All C&A products are 100% recyclable in the patented process. C&A provides customers with a written guarantee that carpet returned for recycling will never be landfilled, incinerated (waste-to energy), or disposed of in any other way.

Checklist

SHOPPING FOR GREEN CARPET

To reduce the environmental impacts of your carpet choice, consider the following when it comes time to buy:

- Buy refurbished carpet whenever possible.
- Specify carpet with high overall recycled content (in the face fiber and backing), preferably post-consumer. EPA's Comprehensive Procurement Guidelines (CPG) designate a 25 -100 % total recovered materials content (all post-consumer) for polyester carpet face fiber. The guidelines for nylon carpet are currently available only in draft form, but they recommend that the face fiber should have a total recovered materials content of 25-100% (1-100% of it post-consumer) and that the backing should be made of 100% recovered materials (with a post-consumer content of 35-70%).
- Ask whether environmental leasing or take-back programs are provided, to ensure that the carpet will be replaced only as necessary and reused or recycled by the producer.
- Use carpet tiles where appropriate to extend the life of the installed floorcovering.
- Buy carpet made from recyclable materials and likely to be easily accepted for recycling under existing programs. Carpet containing nylon 6 face fiber and vinyl-backed carpets are currently recyclable. No recycling programs currently exist for polyester carpet.
- Consider purchasing carpet made of wool or other natural fibers if your primary concern is the use of non-renewable resources.
- Buy carpet that is solution-dyed.
- Buy carpet that meets CRI Indoor Air Quality standards (Green Label program).
- Ensure that low VOC adhesives (CRI certified) are used during installation.
- Buy a carpet product that is consistent with the desired performance level, expected use pattern, and replacement schedule.
- Select an appropriate color for the carpet application. Light colors tend to get soiled easily and may require the frequent use of harsh cleaning chemicals and/or replacement.



Recommended Carpet Brands

MANUFACTURER BRAND	FIBER TYPE	RECYCLED CONTENT	DYEING METHOD	VOLATILE ORGANIC EMISSIONS	RECYCLABILITY
Beaulieu <i>Caladium</i>	Polyester	100% recycled PET recovered from bottles	Beck	CRI standard	No current programs for polyester carpet
Brintons U.S. Axminster <i>Custom Woven</i>	80/20 Wool/ Nylon	None	Yarn	CRI standard	Into other applications
Colin Campbell <i>Nature's Carpet</i>	Wool from organically-raised sheep	None	Carpet is sold un-dyed, or the yarn dyed using vegetable dyes or non-acid dyes	Negligible VOCs detected by lab tests	Biodegradable; puts nitrogen back into the soil
Collins and Aikman <i>Powerbond E3</i>	Nylon 6,6	Vinyl backing contains 100% recycled content (mix of PC and PI materials); 31% to 50% overall recycled content	Solution/ Yarn	CRI standard	All vinyl-backed products are 100% recyclable into carpet backing
Interface <i>"Sabi" and "Prairie School Collection"</i>	Nylon 6,6	100% recycled content GlasBac RE vinyl backing + high recycled content nylon 6,6 face fiber; 51% overall (22% PC + 29% PI) for Sabi and 55% overall (22% PC + 33% PI) for Prairie School	Solution/ Yarn	CRI standard	Recyclable Evergreen leasing program recycles used carpet tiles.
J&J <i>Encore SD Ultima</i>	Nylon 6	25% of face fiber (7% PC + 18% PI content)	Solution/ Yarn	CRI standard	J&J's Carpet Reclamation Program
Lees <i>Unibond, Lees6, Lees Squared</i>	Nylon 6,6	4%-60% of face fiber	Solution/ Yarn	CRI standard	DuPont Carpet Reclamation Program
Mannington <i>Infinity Backing Series</i>	Nylon 6,6	25%-40% in the backing + recycled content face fiber by DuPont	Solution/ Yarn	CRI standard	DuPont Carpet Reclamation Program
Milliken <i>Earth Square (Attitudes, Movements)</i>	Nylon 6,6	Renewed and refurbished product has 100% PC content	Solution, Injection	CRI standard	Renewable
Mohawk <i>ColorStrand Infinity</i>	Nylon 6	50% of face fiber (25% PC + 25% PI content)	Solution	CRI standard	Nylon 6 closed-loop; other materials downcycled
<i>Image (light duty)</i>	Polyester	100% PC face fiber from PET bottles	Piece	CRI standard	No current programs for polyester carpet
Shaw <i>EcoSolution Q fiber + Ecoworx olefin backing</i>	Nylon 6	Face fiber has 25% PC and PI recycled content	Solution	CRI standard	Yarn into yarn; backing into backing
Talisman <i>Envirelon</i>	Polyester	100% face fiber from PC soft drink bottles	Skein	CRI standard	No current programs for polyester carpet

Notes:

- Most manufacturers offer leasing options, if desired by the customer. However, the customer should make sure that the manufacturer commits not to landfill or incinerate the carpet taken back, but instead to refurbish or recycle it.
- Beck dyeing* is a wet process in which carpet sewn into a loop is continuously rotated and immersed in a heated dye vat for several hours (commonly used for cut-pile carpet). *Beck dyeing* is a *piece dye* method.
- Yarn dyeing* is another wet process in which the finished yarn is dyed prior to carpet assembly.
- Skein (or "package" dyeing)* is a wet process that involves reeling the yarn into "skeins" or winding it onto a "package" (on a perforated tube), and dyeing in vats.
- Injection dyeing* involves the use of micro jets to inject dye into the face of the finished carpet.
- PC = Post-consumer
- PI = Post-industrial

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MANUFACTURER CONTACT INFORMATION

Beaulieu of America	(706) 278-6666	www.beaulieu-usa.com
Brintons U.S. Axminster	(662) 332.1581	www.brintonsusax.com
Colin Campbell and Sons	(800) 667-5001	www.colcam.com
Collins and Aikman Floorcoverings	(800) 248-2878	www.powerbond.com
Interface Flooring Systems	(800) 336-0225	www.interfaceinc.com/us
J&J Industries	(800) 241-4586	www.jjindustries.com
Lees Carpets	(800) 523-7888	www.leescarpets.com
Mannington Mills	(800) 241-2262	www.mannington.com
Milliken Carpet	(877) E2 RENEW	www.millikencarpet.com
Mohawk Industries	(800) 554-6637	www.mohawkcarpets.com
Shaw Industries	(800) 441-7429	www.shawinc.com
Talisman Mills	(800) 482-5466	

COMPACT FLUORESCENT LIGHTING



By switching from incandescent lighting to compact fluorescent lighting the average consumer can save 50 to 80% in energy costs without any loss in lighting quality.



The average compact fluorescent bulb lasts 8 to 10 times longer than any incandescent bulb.



Depending on the initial cost of the bulb, the Federal Trade Commission estimates that it costs \$2.60 less per year to power a compact fluorescent bulb than an incandescent bulb. The full purchase price of the bulb will be paid back well within the 10 year life expectancy.



A BRIGHT IDEA!!

The world seems to find CFLs a wise investment.

Global sales rose from 45 million in 1988 to 240 million units in 1995.

The current trend of global warming is mostly attributed to emissions of carbon dioxide from the burning of fossil fuels such as coal. To generate one Kilowatt-hour (kWh) of energy, approximately 2.5 pounds of carbon dioxide (CO₂) are emitted. One kWh is enough energy to run one 100 watt bulb for 10 hours.

Consider that the average home has approximately 34 sockets. If each socket is filled with a 100 watt bulb and is powered for 5 hours each day, 294 pounds of CO₂ are emitted into the atmosphere in one week!

Compact fluorescent bulbs are about 3 to 4 times more efficient than incandescent bulbs. Therefore if all 34 bulbs in our example were replaced with 30 watt compact fluorescent bulbs, only 95 pounds of CO₂ would be emitted into the atmosphere.

continued on page 2

Continued from page 1

The EPA estimates that nearly 25% of the energy needs in the US are dedicated to lighting. If more efficient lighting were to be installed in the majority of places, the US would cut down on particulate emissions of carbon dioxide, sulfur dioxide and nitrogen oxides by 240 million tons per year!

Compact Fluorescent Lamps (CFLs) have come a long way since their inception. CFLs of years past earned a bad name with inadequate technology. For this reason many people think of unnaturally bright lights and loud humming noises when they think of CFL lamps. Fortunately, CFL technology has greatly improved since those days. CFLs are becoming an increasingly wise choice, they yield quick savings on energy bills, emit less heat and allow lower cooling costs, and save on replacement labor costs. Consider that there are approximately 500 million incandescent bulbs in US residential or business buildings using 75–150 Watts, this adds up to the energy produced in twenty 1000 MegaWatt power plants in a year! Imagine saving just 50% of that energy!

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Green Seal President and CEO, *Arthur B. Weissman*

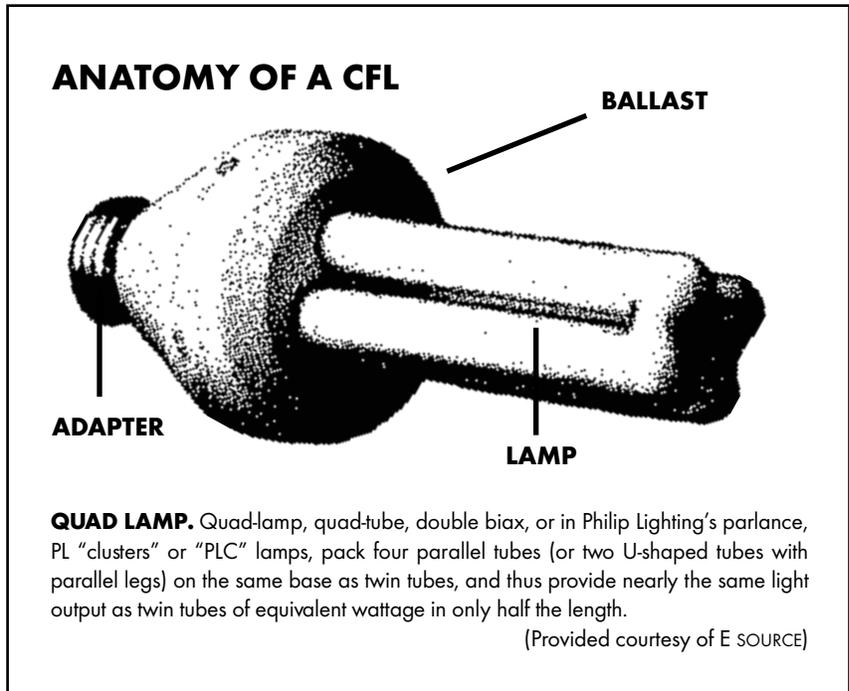
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System Design

A CFL can be found for just about every lighting need. They range in size from 4.5 to 22.5 inches, in power from 5 to 55 watts and in light output from 250 to 4,800 lumens. The average lifetime ranges from 8,000 to 20,000 hours based on three hour uses in each cycle.

Each CFL fixture has three key pieces, a lamp, a ballast and an adapter. To fully understand the different types of CFL systems available, each piece must first be defined.

A CFL can be found for just about every lighting need. They range in size, in power, and in light output.



■ **Lamp**—the glass part of a light bulb that most people think of, but is specifically defined as a combination of electrodes, gasses and other electrical devices designed to provide artificial light through conversion from electricity.

■ **Ballast**—a device used to convert electrical current into the voltage, amperage and waveform needed to operate the lamp.

■ **Adapter**—the screw base of the light bulb, in the US it is the Edison base but can be found in other forms in different countries.

2-D. A relatively new addition in North America to the CFL family is the "2-D" or "double-D" lamp, first introduced in Europe in the mid-1980s and originally available only as an import. This lamp configuration is ideal for low-profile surface and recessed fixtures.

(Provided courtesy of E SOURCE)

Lighting Design

A new generation of electronic ballasts has hurdled CFL technology into the future. Previously, CFLs could only be used in magnetic ballasts which are bulky and often noisy on start up. But ballast manufacturers have developed electronic ballasts which lack the distinct humming noise of CFLs. These new ballasts can power more lamps, last longer, have a greater compatibility and some can also be dimmed. While these ballasts often cost more, they have a greater functionality and use less energy. For example, electronic ballast systems lose 20% less energy than those that are magnetically ballasted.

For this reason, this issue of the *Choose Green Report* focuses on electronic ballasts, and all recommended products are to be used with an electronically ballasted system.

■ **Integral units** are probably the easiest type of replacement for incandescent fixtures because the three key pieces are combined together in one sealed unit. Unfortunately, when these burn out the whole unit must be discarded. Often maintenance crews replace the fixture with regular incandescent bulbs.

■ **Modular units** provide the ease of screw base bulbs without the need for disposal of the whole unit. These bulbs plug into a hardwired ballast/adaptor unit. The only significant issue with this system is purchasing the proper bulb. The units have either two or four pin bases which cannot be interchanged.

■ **Hardwired systems** are a ballast and socket system permanently wired into a fixture. There is no screw base, eliminating the chance of

A CFL FOR EVERY LIGHTING JOB

The graphics and descriptions of all the CFL lamps shown are provided courtesy of E SOURCE, an information services company providing organizations with unbiased, independent analysis of retail energy markets, services and technologies.



HELICAL. Perhaps the most unusual new twist in CFL lamp types is the helical shape being introduced by Duro-Lite under the name Spiral-Lite. This shape closely approaches the light distribution and physical dimensions of incandescent lamps by packing more luminous surface area into a tighter space.



TWIN-TUBE. First introduced to the U.S. market in 1981 under the Philips tradename of "PL," such designs consist of two straight, parallel, miniature fluorescent tubes (or one U-shaped tube with parallel legs) both ending side-by-side in a plug-in base that contains an integral starter. General Electric calls its family of such lamps Biax (short for "biaxial") and many people use this term generically. Sylvania called them "twin tubes." Osram Sylvania uses the original Osram trade name "Dulux." All of these terms describe the same two legged style of lamp.



OCT LAMP. The quadruple twin configuration, also known as "Performance Biax" or "Oct lamp" by General Electric, is available in 28-watt screw-in and 42-watt plug-in models. Though it increases light output per inch of lamp length, its design also traps a great deal of light inside, yielding diminishing efficiency returns.



TRIPLE-TWIN. To generate even more light from a shorter lamp, various manufacturers offer CFLs with three twin tubes. GE Lighting and Osram Sylvania cluster their triple tube lamps in a triangular or "delta" configuration. Other manufacturers, including Philips Lighting, offer triple tube lamps with three parallel arch-shaped curved tubes. These products are often referred to as "triple biax" lamps.

interchange with incandescent bulbs. The bulbs are easily replaced when they burn out

but as with Modular units, the consumer must choose the replacement bulb carefully.

The Lamp Choice

The proper choice of bulb type is important to ensure satisfaction with your choice of lighting. For this reason choosing the proper size, wattage and lumens is important but also sometimes tricky. In the past manufacturers stated that a CFL with 1/4 the wattage could replace an incandescent fixture and produce the same light output. However, a few initial disappointments with illumination forced the development of a more realistic rule of thumb, a 3:1 ratio. A CFL rated at 20 Watts can easily replace an incandescent of 60 Watts. Three specific issues must be reviewed to ensure proper lighting.

The *Efficacy* of a lamp is a measure of how much of the power going into the lamp is being converted into light. Efficacy is evaluated in lumens per watt.

Green Seal recommends the lamp efficacies in Table 1 for lamps without ballasts.

A RULE OF THUMB— 3:1 A CFL with 1/3 the wattage can replace an incandescent fixture and produce the same light output.

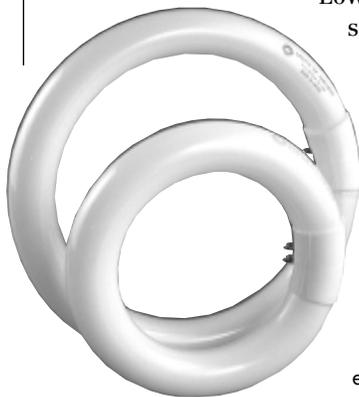


TABLE 1

RECOMMENDED EFFICACIES FOR COMPACT FLUORESCENT LAMPS

Lamp Wattage (watt)	Lamp Efficacy (lumens/watt)
< 7 watt	40 lumens/watt
7 - 9 watt	50 lumens/watt
>9 - 13 watt	55 lumens/watt
>13 - 18 watt	60 lumens/watt
>18 watt	62 lumens/watt

TABLE 2

RECOMMENDED EFFICACIES FOR SELF BALLASTED LAMPS (or when lamps and ballasts are supplied together)

Lamp Wattage (watt)	Lamp Efficacy (lumens/watt)
< 10 watt	40 lumens/watt
10 - 15 watt	45 lumens/watt
> 15 watt	55 lumens/watt

For those self ballasted lamps or when lamps and ballasts are supplied together other recommendations are made (see Table 2).

The *Color Temperature* is another issue that was previously problematic for consumers. Four color temperatures are generally available, 2700 K, 3000 K, 3500 K and 4100 K. Depending on both the size and the manufacturer higher temperatures can be found.

Lower temperatures provide a softer color that is more acceptable in lower lighting levels or an office maintaining soft

lighting. The color associated with incandescent bulbs is approximated at 2700 K.

The *Color Rendering Index* (CRI) is a measure of a light source's ability to illuminate true colors. The CRI ranges from 1 to 100. A CRI of 80 or above indicates that the light source can reproduce colors accurately.

Utilities have been strongly promoting the switch to CFLs for years. However, various studies show that a market saturated with lower quality CFLs could cause a decrease in power quality. For this reason, Power Factor and Total

CIRCLINE. Circular (also known as "Circline") fluorescent lamps are not universally viewed as members of the CFL family. They came into use in the 1940s, and many of them utilize the same cool white phosphors as standard T12 lamps. However, at least one manufacturer—Lights of America—produces circular compact fluorescents with rare earth trisimulus phosphors and instant-on electronic ballasts in warm and cool color temperatures. The 20-, 22-, and 30-watt versions from Lights of America are among the few compact fluorescents that can replace 100- to 150-watt incandescents with comparable light output and still fit in residential reading lamps. Philips offers Circlines with rare earth phosphors but does not sell them with ballasts. (Provided courtesy of E SOURCE)

F-LAMP. The "F-Lamp" features two twin tubes aligned in a single plane, shoulder to shoulder. F-Lamps are well suited to task lights and low-profile surface and recessed fixtures. (Provided courtesy of E SOURCE)



fixtures can cause the cost factor for the consumer to double, it may be easier to find alternative methods to lighting a room. However, market demand is slowly forcing manufacturers to produce

some products that are both dimmable and cost efficient. Other manufacturers are producing three step dimming as an easier alternative since a re-wiring is not needed.

Mercury and Radioisotopes

Within each compact fluorescent lamp is a small amount of mercury needed to provide fluorescence. The Green Seal standard (GS-5) allows a maximum average of 10 milligrams per bulb. Of major concern is the possibility of leaking mercury into groundwater after break up in disposal. However, some studies suggest that the mercury is sputtered onto the glass throughout the lifetime of the bulb, binding it tightly with the surface. However, since less energy is needed for CFL use, less mercury containing coal is burned. This results in less total mercury being released for CFLs than for incandescent lamps. In fact, incandescent bulbs are responsible for releasing more than twice as much mercury into the environment than compact fluorescent bulbs.

Another concern is that some bulbs used in magnetic ballasts contain certain radioisotopes such as Krypton-85, Promethium-147 or Tritium. These compounds are used to provide initial ionization and aid starting. Green Seal prohibits the presence of any radioisotopes in certified CFLs.

Choosing the Right CFL

It may seem difficult to choose the right CFL without wasting money. But by examining your needs thoroughly and reviewing market availability, it should not be a trying experience. Look for testing and performance data from independent laboratories to insure truthful reporting.

When you know which CFL is right for you, contact your local utility company to inquire about rebate options, then request information or samples from some of the CFL manufacturers listed below. In all, remember that your investment will pay off both in economic and environmental value.

WHAT TO LOOK FOR IN A CFL

- A CFL lamp that uses 1/3 the wattage of your current incandescent bulb.
- A lamp that fits your shape, size and configuration requirements.
- An Efficacy meeting the minimum Green Seal guidelines
- A Color Temperature which replicates your current lighting.
- A system with a Power Factor equal to or greater than 90%.
- A system with a Total Harmonic Distortion Rating of 33% or less.
- A lamp with 10 mg or less of Mercury.
- A lamp without any radioisotopes.

Harmonic Distortion (THD) become decision factors, especially for businesses considering a total exchange of their incandescent fixtures for compact fluorescent systems. CFLs with a low power factor could cause a shift in the current, resulting in it going out of phase with the source voltage. A high THD can cause voltage distortion and ruin the power quality. Green Seal requires all Class A certified products to have a power factor greater than 0.9 and the THD to be less than 33%. This should prevent the degradation in power quality that can be associated with large amounts of end-use products, such as CFLs, on a specific power grid. It should be noted that consumers who place CFLs in their homes do not need to be greatly concerned with Power Factor or THD.

Dimming The Bulb

It has been difficult to find CFL fixtures which provided dimming capabilities in a cost effective and reliable manner. Now four pin CFLs with advanced electronic ballasts can be dimmed. Because the cost factor of implementing the technology in small wattage CFLs is the same as in large, manufacturers have been hesitant to include the technology throughout their lines of products. Also, because special ballasts are needed for smooth dimming CFLs, only new or re-wired buildings are considered to be the applicable market. Since choosing dimming

Recommended Products

PRODUCT NAME	WATTAGE	RATED LIFETIME (HR)	COLOR TEMP (K)	CRI	THD %	POWER FACTOR
GE FLE15TBX/HPF/SPX27/SW	15	10,000	2700	82	20	.95
GE FLE20TBX/HPF/SPX27/SW	20	10,000	2700	82	20	.95
GE FLE20TBX/HPF/RFL/SW	20	10,000	2700	82	20	.95
GE FLE25TBX/HPF/SPX27/SW	25	10,000	2700	82	20	.95
GE FLE30QBX/HPF/SPX27/SW	30	10,000	2700	82	20	.95
GE FEA22/2D/HPF/SW/CD	22	10,000	2700	82	20	.9
GE FEA39/2D/HPF/SW/CD	39	10,000	2700	82	20	.9
GE FLA13/SPX27	13	10,000	2700	82	33	.9
Lights of America 2620 Circline	20	12,000	2800	84	33	.95
Lights of America 2622 Circline	22	12,000	2800	84	33	.95
Lights of America 2630 Circline	30	12,000	2800	84	33	.95
Link USA International HSQ150/28W	28	12,000	2700	82	.90	30
Link USA International HSQ200/38W	38	12,000	2700	82	.90	30
MaxLite SK America Inc. SKM311EA/EB	11	10,000	2700-6500	84	15	.97
MaxLite SK America Inc. SKM315EA/EB	15	10,000	2700-6500	84	15	.97
MaxLite SK America Inc. SK122 ER	22	40,000	2700-6500	84	15	.97
MaxLite SK America Inc. SK323 EA	23	40,000	2700-6500	84	15	.97
MaxLite SK America Inc. SK130 ER	30	40,000	2700-6500	84	15	.97
Panasonic EFT15E28.UHD	15	10,000	2800, 5000	84-88	25	.90
Panasonic EFT20E28.UHD	20	10,000	2800, 5000	84-88	30	.90
Panasonic EFT24E28.UHD	24	10,000	2800, 5000	84-88	30	.90
ProLight HR40/26/RJ	29	70,000	3000	85	33	.95
ProLight HR40/26S/RJ	29	70,000	3000	85	33	.95
ProLight HR40/26F/RJ	29	70,000	3000	85	33	.95
ProLight HR40/32/RJ	34	70,000	3000	85	33	.95

NOTES:

THD = Total Harmonic Distortion

CRI = Color Rendering Index

RECOMMENDED PRODUCTS are those that have a power factor greater or equal to .9, a THD level less than 33%, a rated lifetime of at least 8,000 hours, a CRI of 80 or more, as well as efficacy levels meeting the Green Seal guidelines.

Recommended Products (continued)

PRODUCT NAME	WATTAGE	RATED LIFETIME (HR)	COLOR TEMP (K)	CRI	THD %	POWER FACTOR
ProLight EH27W (EH27WL)	24	70,000	3000	84	33	.9
ProLight EH18W (EH18WL)	19	70,000	3000	84	33	.9
ProLight CL30H	30	10,000	2700	84	33	.9
ProLight CL22H	24	10,000	2700	84	33	.9
ProLight CL20H	20	10,000	3000	84	33	.9

NOTES:

THD = Total Harmonic Distortion

CRI = Color Rendering Index

RECOMMENDED PRODUCTS are those that have a power factor greater or equal to .9, a THD level less than 33%, a rated lifetime of at least 8,000 hours, a CRI of 80 or more, as well as efficacy levels meeting the Green Seal guidelines.

Other Specialty Products

PRODUCT NAME	WATTAGE	RATED LIFETIME (HR)	COLOR TEMP (K)	CRI	THD %	POWER FACTOR
Link USA International LKGE124 Chandelier lamp	4	10,000	2700	82	N/A	.65
Link USA International LKGC504 Candle lamp	4	10,000	2700	82	N/A	.65

NOTES:

THD = Total Harmonic Distortion

CRI = Color Rendering Index

OTHER SPECIALTY PRODUCTS have a rated lifetime of at least 8,000 hours, efficacy levels that meet the Green Seal guidelines, a CRI of 80 or more but have a lower power factor and THD than the recommended products. These items are highlighted because their lamp shape is widely used but was previously difficult to find in CFL form.

MANUFACTURER CONTACT INFORMATION

GE Lighting	1-800-626-2004
Lights of America	1-909-594-7883
Link USA	1-800-224-4228
MaxLite SK America, Inc.	1-800-555-5629
Panasonic Lighting	1-201-348-5381
ProLight	1-800-968-2556



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IN THIS ISSUE

- **Recommended Compact Fluorescent Lamps**
- *Understanding system and lighting designs*
- *Choosing the lamp for your needs*

WHAT'S THE REAL PRICE OF LIGHTING?

The real price of lighting is not simply its initial cost, but the cost of selecting, buying, installing, maintaining and operating the bulb system. This adds up to the life-cycle cost of using the lighting product. Converting your current incandescent lighting to compact fluorescent lighting can appear to be a costly matter at first glance.

But determining and comparing the life-cycle costs can show that buying green lighting is actually cheaper in the end.

COMPARE THESE TWO LIGHTING OPTIONS OVER 10,000 HOURS OF USE

	Incandescent	Compact Fluorescent
Initial Costs (without labor)	$\$1.10 \times 10 = \11.00	\$15.00
Operating Costs	$\$8.00 \times 10 = \80.00	\$21.60
TOTAL LIFE-CYCLE COST:	\$91.00	\$36.60



GREEN

R E P O R T

SEPTEMBER 1997

COPY PAPER

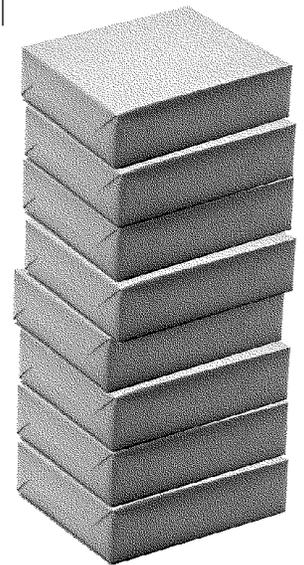
ffices across the United States are hungry. Hungry for paper, that is. By the time you finish reading this report, you will have been responsible for the consumption of almost a sheet of copy paper. By the time you leave work for the evening that number will have increased to over 27 sheets and by year's end, as the representative average American office worker, you will have consumed 10,000 sheets of paper, or about 100 pounds of paper. Overall, the annual consumption of copy paper in the U.S. is about 3.5 million tons.

Astounding? Yes! But let's face it, copy paper is essential to our every-day working lives. Corporate America, as we know it, could not function without it. The challenge then is to become an educated and responsible paper consumer. We need to learn to reduce the amount of paper we use daily. We need to recycle the copy paper we do use and we must use the most environmentally responsible paper products available on the market.

This *Choose Green Report* will present the most up-to-date information on responsible copy paper brands and will discuss paper reduction and recycling strategies. Green Seal surveyed paper manufacturers, both large and small, and selected 25 paper products to recommend in our product table. They include 2 Green Buys and 15 Honorable Mentions.

The Recommended Products table lists copy paper manufacturers and brands. It contains information on recycled content and the bleaching process, as well as information on basis weight and brightness. Suggestions for reducing, reusing and recycling copy paper are offered prior to product recommendations.

American office workers consume 10,000 sheets (about 100 pounds) of paper a year. The annual U.S. consumption of copy paper is about 3.5 million tons.



GREEN SEALS
Choose

Reduce and Reuse

The U.S. paper industry is the largest single user of fuel oil and the third largest consumer of energy among American industries. American pulp mills grind up more than 12,000 square miles of forest per year and paper comprises 40 to 50% of the trash in typical landfills. These impacts make it imperative that we conserve paper as much as possible. Conserving saves money and the environment at the same time. This is due to the fact that conservation results in a reduction in the total amount of paper used and decreases the environmental hazards associated with processing and disposal.

There are many ways that you and your office can reduce the amount of copy and other office paper that gets used every day.

■ **Reduce your copier image size** by 29%. This allows two 8 1/2 by 11 sheets to be placed on one page. Image reduction is also possible when printing from your computer. For example, many word processors can print two

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pages on each output page. This is often referred to as "2-up" printing.

■ **Use lighter weight paper** (to reduce the amount of materials used in the making of the paper) whenever possible.

■ **Duplex your documents** whenever possible.

■ **Create inter-office memos** that can be posted and checked off after they have been read. Use inter-office, electronic mail to leave messages or provide office information.

■ **Decrease margins, page size, and number of pages** in your publications. Decrease the number of spaces after periods, between paragraphs and after headings.

■ **Decrease the number of your mailings** and eliminate consecutive issues that contain a majority of previously advertised items.

■ **Switch to fax modems.** Any document prepared on a PC can be linked directly to a fax modem. The document is converted to a form that can be transmitted, as by a telephone, to another fax modem at the document's final destination. By using this technology, the need for paper is eliminated on one or both sides of the document's transmittal.

■ **Look into integrated paperless systems.** These are totally paperless document communication systems that incorporate OCR (optical character recognition), form-processing, and archiving with a network of PCs, scanners, and storage devices.

These systems, however, can be quite expensive and may not yet be feasible for the small office.

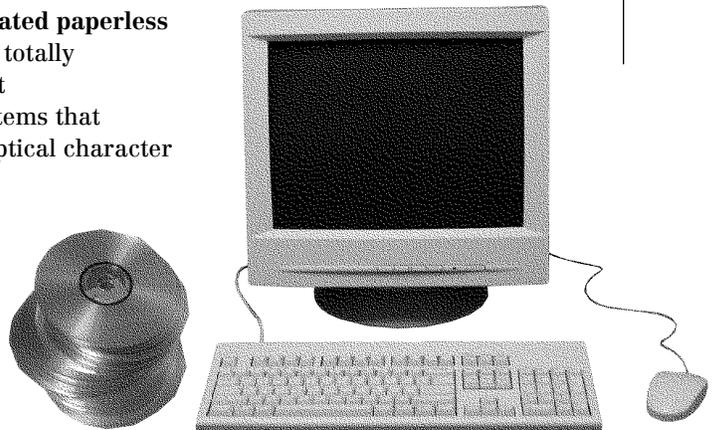
■ **Look into the Electronic Data Interchange (EDI).** This system incorporates a common digital format, so that business information can be easily transferred from one computer to another. EDI is typically used for purchase orders, invoices, check issuance, shipment notification and the electronic transfer of funds.

■ **Publish your documents on CD-ROM.**

■ **Eliminate unnecessary subscriptions** to newsletters, newspapers, and magazines. Have your name removed from mailing lists in order to reduce the amount of bulk mail you receive.

■ **Conduct an internal audit** to determine the type and amount of waste that your company generates. From this information, new work methods can be developed to reduce or eliminate waste. Be creative and brainstorm!

Strive for the "Paperless Office": switch to fax modems; use email; publish documents on CD-ROM.



Recycle What You Do Use!

Once you have decreased the amount of paper you use, it is essential to recycle the paper that you do! Some states and municipalities are even mandating the recycling of copy paper and this is a great idea! America is generating over 160 million tons of solid waste per year and 40% or more of that waste is paper and paper-related products. By recycling office papers you can help save the natural environment as well as save money. Recycling also saves energy. It takes 30-55% less energy to produce the same weight of recycled paper as making the paper directly from trees. It reduces air pollution created by pulp mills by 74-95% and lowers their water pollution by 35%. Recycling also conserves large quantities of landfill space. As much as \$50 per ton in landfill costs is saved for every ton of paper that is not thrown away. And by the way, practicing recycling in your office and using recycled products is a lot easier than you think.

■ **Avoid the use of glossy or colored papers and papers with sticky backings.** These type of papers have smaller recyclable value or none at all. In addition, adhesives decrease the quality of the wastepaper, which requires the mill to run higher, cleaner, and therefore more expensive grades of wastepaper.

■ **Place recycling bins in high-traffic areas** (e.g. beside shredders, copiers, mailrooms, and desks). If your office does not have a recycling plan—start one right away.

■ **Ask your copy service to use environmentally responsible paper** (uses a minimum of 20%

postconsumer content and is either PCF or ECF). If your copy service is unwilling to use this type of paper, you may want to bring your own the next time you require their services.

■ **Place a “recycled paper” message on all of your outgoing publications.** Getting the “word” out reminds everyone just how important recycling is.

■ **Insist on a lower price!** More often than not you can insist on a



cheaper price for cases of recycled paper. Be insistent and work through the hierarchies!

THE QUALITY AND COSTS OF RECYCLED PAPERS

In the past, there have been concerns as to the performance and quality of copy paper made from recycled content. Great strides have been made in the past ten years to improve processing, and mills have become well educated in the making of recycled papers. Today's recycled copy papers work well in almost any printer or copier (check owner's manuals for more information), will not affect most warranties, come in a wide variety of grades and colors, and provide, in most cases, the quality and dependability that businesses find with virgin products.

Recycled paper prices have also been a concern of consumers. Paper costs are on the rise for both recycled and virgin paper products. In some areas, recycled paper may still cost more than virgin paper, and these cost differences arise from several factors. Clean wastepaper has been in limited supply and expensive. The quantity of recycled paper being produced is still relatively small and is at the mercy of economics, technology and availability of waste-paper and de-inking facilities. As the demand for recycled products is expected to increase so too are the processing costs expected to decrease. So don't give up hope! As more de-inking facilities become available, processing technologies refined, and wastepaper collection improves, costs should normalize and any savings eventually passed on to the consumer. Even now, competitive prices can be found with a little investigation on your part.



CHOOSING THE RIGHT COPY PAPER

Now that you have the reduction and recycling facts, it is time to address the choice of copy paper. Green Seal recommends using paper with the highest postconsumer content (minimum 20%). We also recommend the use of process chlorine free papers whenever possible. The basis weight (the weight in pounds of 500, 17X22 sheets) for all of the papers considered is between 20 and 24 pounds.

The Debate Over Bleaching — What's It All About?

Bleaching is the process by which lignin (the compound that holds the wood fibers, or cellulose, together) is dissolved. Other colored impurities as well as acids and resins that would show up as dark spots on the paper, are also removed during bleaching. The

brightness of the paper is obtained by dissolving the lignin through chlorination. By removing the lignin, the remaining cellulose fibers appear white (brighter) to the human eye. Brightness is a measure of the percentage of light that reflects off of the paper.

Unfortunately, during the bleaching process, organochlorides are formed, including dioxins and furans. The average North American pulp mill has been producing 35-50 tons of these chlorinated substances every day. Dioxins are a man-made carcinogen that can bioaccumulate and move upward through the food chain. They have been linked to elevated cancer rates, are often mutagenic and can be extremely toxic. However, the debate as to how hazardous low levels of the toxin are, continues. This is because there is no consensus on

the toxicity of dioxin. It acts differently on different species of animals. Dioxins are also widespread in our environment. This makes it extremely difficult to isolate and evaluate the health implications of contact with dioxin from a specific source. Health and environmental studies as well as the debate will surely continue on. In response to consumer concerns and potential health risks, however, paper mills have been seeking alternative bleaching strategies.

■ **Elemental Chlorine Free (ECF) paper.** In this process, bleaching occurs with the use of a chlorine derivative, such as chlorine dioxide, instead of elemental chlorine gas. In this way, fewer chlorinated by-products are produced (organochloride emissions are often cut in half). Chlorine dioxide is also the least expensive bleaching compound

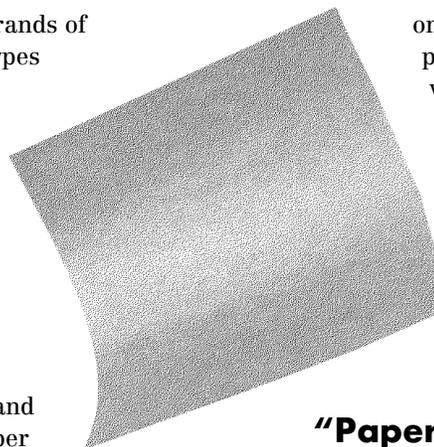
A DIFFERENT KIND OF SUCCESS STORY

So you still have some “doubting Thomases” and wafflers in your office that don't believe that recycled is as good as virgin? Then do what Sandy Jones, the Regional Environmental Recycling Coordinator for the General Services Administration (GSA), did.

Ms. Jones was encountering many people who claimed that recycled paper was of the same inferior quality of the “old days”. They claimed it was unattractive, was discolored, often had brown spots in it, and that it just felt and looked altogether different than virgin paper. Ms. Jones highly disagreed and created a unique way to convince them otherwise. Prior to the October 1996 Paper Summit, Ms. Jones collected

several brands of various types and weights of paper. For each category she selected, she chose both a recycled and virgin paper version. At the summit, which was attended by all types of professionals including paper manufacturers, environmental proponents and government representatives, she put these experts to the test. She asked each

one to determine which papers were recycled and which were not. Not one single person could correctly identify the



Give your office a chance to take the “Paper Test” — is it recycled or virgin?

recycled versus the virgin products. Why not put your own office to the test? Odds are in favor of the recycled choice.

available. However, harmful chlorinated by-products are still produced. These include known carcinogens and ozone depleters as well as sodium chlorate, which is toxic to aquatic life.

■ **Process Chlorine Free (PCF) paper.** This is a recycled-content paper product that is processed without additional chlorine or chlorine derivatives. The sheets that are produced contain both recycled and virgin fibers. To be labeled PCF, the paper must contain at least 20% postconsumer fiber that has not been rebleached with chlorine-containing compounds. Any virgin content must be totally chlorine free.

■ **Totally Chlorine Free (TCF) paper.** This is a paper that is manufactured without any chlorine compounds. The pulp is whitened by alternative bleaching agents, such as hydrogen peroxide, ozone, enzyme bleaching or oxygen delignification. No organochlorides, including dioxins and furans, are produced with this papermaking process. For the purpose of this report, to be considered TCF, **both** recycled and virgin fibers must have been processed without chlorine containing compounds. In this definition, a totally chlorine free copy paper is only possible when the paper contains 100% virgin fiber, because there are no current controls to ensure that any recycled fiber content has never been processed with elemental chlorine or chlorine derivatives.

Green Seal therefore recommends that you choose PCF papers whenever possible. PCF has not yet gained market demand to any great degree so it is often difficult to obtain certain choices of copy paper that are PCF. It is important for you as a consumer to create a market for PCF, thereby encouraging lower costs and a

more rapid change-over by paper mills. A strong desire by the market for PCF will also encourage mills to skip ECF retrofits and go directly to PCF technologies.

If a PCF paper is not available to you, try finding lines that are ECF. Many mills have now adopted this bleaching process and many copy paper lines are available. Although not as preferable as PCF, ECF is still much better than using elemental chlorine.

Recycled Content

After you have chosen the paper you want with the safest bleaching process available, you must consider the recycled content of the paper. Green Seal looks at two components relative to recycling. These are postconsumer recycled content (%PC) and total recycled content (%TC).

Postconsumer content refers to end products that were generated by consumers. These have been separated from the solid waste stream and have been recycled instead of being dumped in a landfill or incinerated. Examples of this type of paper include office wastepaper, bulk mail, magazines, newspaper, and certain packaging materials. Like the federal Executive Order, Green Seal requires a minimum of 20% postconsumer content to be considered for recommendation. It should be mentioned, however, that the Order requires that postconsumer content of printing and writing paper (including copy paper) sales to U.S. government agencies be increased from 20 to 30% by December 31, 1998. Green Seal's standards will be adjusted accordingly on or before this date. Many paper manufacturers are already gearing up for these changes.



The paper manufacturers also recycle and recapture fibers prior to consumer use. These “left-over” fibers are from manufacturing, converting, and printing processes and include mill

scraps, dinking material, and pulp substitutes. These fibers are then used in future processing and are referred to as preconsumer recycled content.

Total recycled content refers to both postconsumer and preconsumer content. Paper manufacturers often refer to their total recycled content without breaking the percentages down into post and pre consumer content. This can be misleading and confusing to the consumer. Be alert, therefore, and always choose the paper with the highest postconsumer content. Doing so will encourage companies to increase the content of postconsumer recycled material and will benefit and encourage paper recycling programs nationwide.

Green Seal recommends using copy paper that is Process Chlorine Free and at least 20% postconsumer recycled content.

Copy Paper Recommendations

MANUFACTURER • Brand Name	%PC	% TC	BLEACH	WEIGHT	BRIGHTNESS	OTHER
Green Buys						
Arbokem • Downtown Paper #3 (604) 322-1317	50%	*	**	20#	80+	Totally effluent free
Fort James Corporation • Eureka! 100 Premium Recycled (800) 854-5345	100%	100%	PCF	20# 24#	84	
Honorable Mentions						
Riverside Paper • Ecology Copy Bond (414) 749-2210	35%	100%	ECF	20#	76-82	Acid Free.*** Watermarked, multi- purpose duplicating, printing, copying
Rolland, Inc. • New Life Repro (800) 567-9872	30%	50%	Recycled content is PCF; Virgin content is ECF	20#	90	ECP
Domtar • Windsor Copy Recycled (800) 6DOMTAR or (800) 267-2040	20%	20%	ECF	20#	84	Acid Free***
Fraser Paper • Worx Multipurpose (800) 543-3297	20%	20%	ECF	20#	88	
Hammermill • Savings DP (800) 242-2148	20%	20%	ECF	20# 24#	84	
Hammermill • Copy Plus Recycled (800) 242-2148	20%	20%	ECF	20#	84	
Hammermill • Copy Plus (800) 242-2148	20%	20%	ECF	20#	n/a	Comes in 10 colors
International Paper • Springhill Recycled Relay (800) 223-1268	20%	20%	ECF	20#	84	
International Paper • Springhill Relay Plus (800) 223-1268	20%	20%	ECF	20# 24#	84+	White and colors available
Rolland, Inc. • Rolland Laser Hi-Tech (800) 567-9872	20%	20%	Recycled content is PCF; Virgin content is ECF	20#	94	
Rolland, Inc. • Repro Plus (800) 567-9872	20%	20%	Recycled content is PCF; Virgin content is ECF	20#	90	
Weyerhaeuser Paper Company • Recycled Lynx Opaque-LQ (800)523-5590	20%	20%	ECF	20# 24#	92	Acid-free***
Weyerhaeuser Paper Company • Recycled Husky Xerocopy D.P. (800) 523-5590	20%	20%	ECF	20#	84	Acid-Free***
Weyerhaeuser Paper Company • Weyerhaeuser Recycled Office Paper (800) 523-5590	20%	20%	ECF	20#	84	Acid-Free***
Weyerhaeuser Paper Company • Recycled Laser Copy (800) 523-5590	20%	20%	ECF	20# 24#	88	Acid-Free***

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Copy Paper Recommendations continued

MANUFACTURER • Brand Name	%PC	% TC	BLEACH	WEIGHT	BRIGHTNESS	OTHER
Other Recommendations						
Fort James Corporation • Eurekal 35 Premium Recycled (800) 854-5345	35%	35%	Recycled content is PCF; Virgin content is Cl or ECF	20# 24#	86.5	
Union Camp Corp. • Great White Recycled Content: Multi-Purpose (888) 478-9448	25%	25%	Portion ECF	20# 24#	84	Acid-free***
Boise Cascade • Cascade MP Granites (630) 238-6622	20%	20%	Cl	20#	n/a	Acid-free*** Working toward ECF
Boise Cascade • Aspen Xerographic (638) 238-6622	20%	20%	Cl	20#	83	Acid-free*** Working toward ECF
Champion International Corp. • Multipurpose Recycled (800) 443-9773	20%	20%	Cl	20#	84	Working toward ECF
Georgia-Pacific • GeoCycle (800) 727-3738	20%	20%	80% ECF 20% Cl	20#	84	Acid-Free***
Fort James Corporation • Eurekal 20 Premium Recycled (800) 854-5345	20%	20%	Recycled content is PCF; Virgin content is Cl or ECF	20#	84	White and 12 colors available
Xerox • Recycled Business Paper (800) 822-2200)	20%	20%	Recycled content is PCF; Virgin content is Cl	20#	84	

NOTES:

Green Buys are copy papers that (1) meet or exceed the minimum requirement of 20% postconsumer recycled content and (2) are not bleached with elemental chlorine or a chlorine derivative and are considered PCF. The recycled portion may have been chlorine-bleached in its original manufacturing.

Honorable Mentions are papers that meet or exceed the minimum requirement of 20% postconsumer recycled content and are ECF.

%PC= Postconsumer recycled content.

%TC= Total recycled content, including pre and post consumer fibers.

Cl=Indicates paper has been bleached with elemental chlorine.

ECF= Elemental chlorine free.

PCF= Process chlorine free.

TCF= Totally chlorine free.

ECP= Indicates papers that have been certified by Canada's Environmental Choice Program.

* 50% tree-free, Agri-Pulp™, 50% postconsumer recycled content.

** Arbokem describes their bleaching process in the following manner. The virgin content (Agri-Pulp™) has not been bleached with elemental chlorine or chlorine derivatives and is considered TCF. The recycled content is secondarily chlorine free, meaning that fibers have not been re-bleached with chlorine-containing compounds. Green Seal would consider this PCF.

*** Acid free papers tend to have a longer lifespan (200 years versus 50) and retain their crispness, suppleness, strength, and color longer than acidic papers. They also have better print characteristics, and enhanced bulk, brightness, and opacity qualities.



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IN THIS ISSUE

- *Suggestions for Reducing and Reusing Copy Paper*
- *Recycling Strategies*
- *How to Choose the Right Copy Paper*
- ***Recommended Copy Papers***

SEND US YOUR SUGGESTIONS AND COMMENTS!

Do you have an idea for a topic that you would like to see in a future *Choose Green Report*?

Do you have comments or suggestions concerning the reports? Do you know someone who would like to become an Environmental Partner?

We would love to hear from you! Just fill in the space to the right with your ideas and comments, along with your name, company's name, address, and phone number. Simply fax this page back to Green Seal at 202-588-8465, or email us at: green Seal@green Seal.org.

Thank you for your input!



COMMENTS

NAME

COMPANY

ADDRESS

PHONE/FAX

GREEN REPORT

GREEN SEALS' S
Choose

INDUSTRIAL AND INSTITUTIONAL CLEANERS

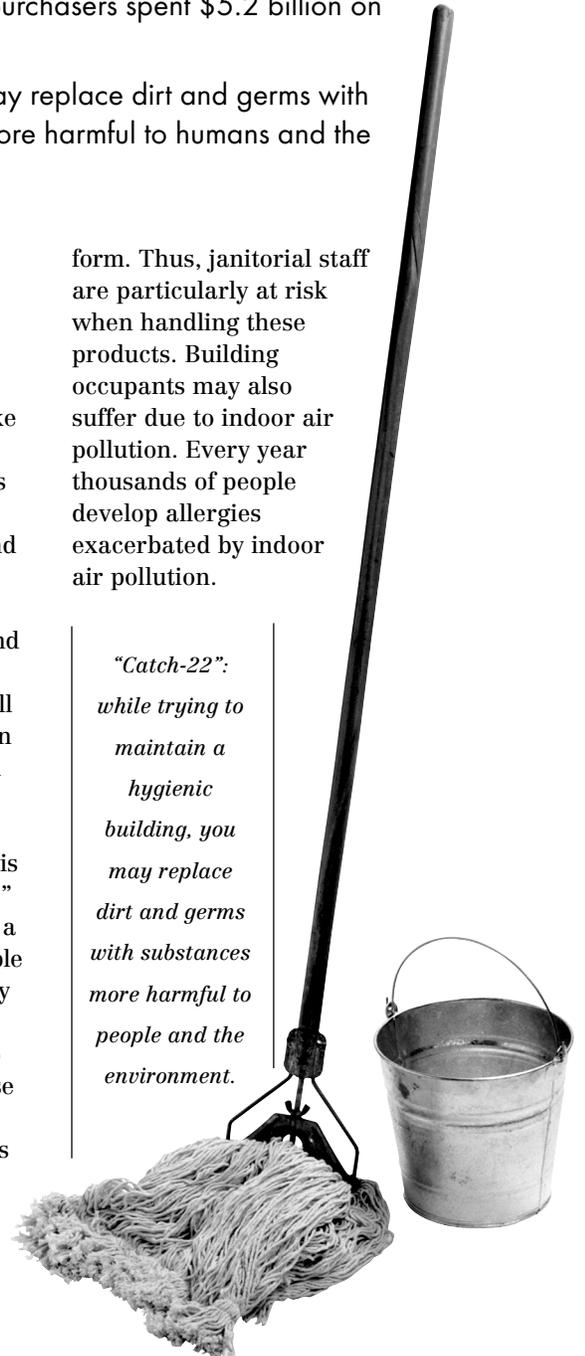
- The average person spends about 90 percent of their day indoors, where air pollution—from diverse sources such as cleaners, upholstery and carpeting—can be up to 100 times greater than the outdoor air.
- Industrial and institutional purchasers spent \$5.2 billion on cleaners in 1998.
- Some cleaning products may replace dirt and germs with substances that are even more harmful to humans and the environment.

The ubiquitous nature of cleaning products—combined with the duration that people are exposed to them and their potential harm to the natural environment—make the move toward more environmentally sound cleaning products crucial.

Maintaining clean buildings and facilities is essential to ensuring that employees are healthy and productive and visitors are safe and comfortable. Choosing industrial and institutional cleaners that will make your building squeaky clean as well as environmentally sound can be challenging, as many products on the market contain toxic or hazardous chemicals. This situation can present a “catch-22” because while trying to maintain a hygienic environment for the people in your building, you may actually be replacing dirt and germs with substances even more harmful to people and the environment. These cleaners are generally more powerful than household cleaners and sold in a more concentrated

form. Thus, janitorial staff are particularly at risk when handling these products. Building occupants may also suffer due to indoor air pollution. Every year thousands of people develop allergies exacerbated by indoor air pollution.

*“Catch-22”:
while trying to
maintain a
hygienic
building, you
may replace
dirt and germs
with substances
more harmful to
people and the
environment.*





Industrial and institutional cleaners may contain many toxic chemicals. Often, more than one type of cleaner is used within a single building, facility or room. The combined effect of multiple toxic or hazardous chemicals, even in minute amounts, can magnify the negative effects of the individual ingredients. Depending upon the duration, route and extent of exposure, certain ingredients in industrial and institutional (I & I) cleaners may cause mild to serious health impacts. Short term health problems caused by exposure range from eye irritation and coughing to chest pain, vomiting, cramps and diarrhea. Long term effects may include liver and kidney failure, birth defects, emphysema, brain damage and even cancer.

Our lakes, rivers, and oceans are being polluted by many of the chemicals found in cleaning products used by establishments as diverse as hospitals and hotels, and institutions from governments

to universities. Rinsing and disposal of spent solutions, containers and cleaning cloths can cause negative environmental and ecological impacts. For instance,

chlorine and phosphates added to some cleaners as bleaching and building agents, respectively, can cause serious harm to aquatic ecosystems and the plants, invertebrates and fish within.

In response to increasing consumer health and safety concerns and governmental regulation of chemical constituents, many manufacturers of I & I cleaners have introduced environmentally preferable alternatives. Carefully evaluating your cleaning needs and identifying the products that will accomplish the task without causing harm is possible, once you know how. By following a few guidelines and thinking green, you can make a significant difference in both the health of your employees and the future of the planet.

How To Be Clean and Green

Green Seal contacted over 60 manufacturers of I & I cleaners to gather product information. We evaluated these products using the environmental criteria discussed below, and developed a list of recommended cleaners which meet the criteria. Although the I & I cleaner category covers products for a range of uses, we limited the

There are over 70,000 chemicals being used today. Fewer than 2% have been thoroughly tested for their effects on human and aquatic life.

evaluation and review to the categories most applicable to a wide audience: general purpose, multi-purpose, floor and bathroom cleaners. Please note that many of the manufacturers offer products that can meet more specific needs.

■ Is it non-toxic to both humans and aquatic life?

Various components of I & I cleaners, such as surfactants, bleaches, builders and enzymes, are necessary to impart desirable performance attributes to the final products. However, the nature of the chemical additives used in many cleaners makes toxicity a major issue in this product category. Not all of the chemicals used are toxic, but those that are may damage organs, tissues and cells, and inhibit proper systemic functions of aquatic plants and animals as well as humans. Cationic surfactants used in germicidal cleaners are generally the most toxic, as their main purpose is to kill (see section on disinfectants).

Pathways of exposure for people vary, from oral intake and inhalation to dermal absorption. Some short term effects of exposure to toxic chemicals can include skin irritation and respiratory problems, while long term exposure may result in permanent damage such as bone marrow loss or lung cancer. Avoid cleaners that are toxic to prevent harm to workers, building occupants and the aquatic environments where cleaning waste or wastewater may end up.

■ Is it biodegradable?

Biodegradability is measured by the amount of time it takes for large organic molecules to break down into smaller molecules in the environment. A chemical that is readily biodegradable begins to break down immediately and eventually degrades into water, mineral salts, carbon dioxide and

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GET THE DIRT ON YOUR CLEANERS

We have provided a list of cleaners that meet the criteria discussed in this report. To find out what is inside your cleaning products, follow these steps until you get the answers you need. If your cleaners do not meet the preferred attributes, consider substituting them with some of the products recommended in this report.

1 Read the label

Labels do not always tell the whole story, as there is limited space on the label, and manufacturers are not required to list product ingredients. However, labels are a good place to start because they will have basic information about safe use and will provide information on immediate health risks. The Consumer Product Safety Commission requires that appropriate signal words be placed on the labels, as these will indicate the nature of the potential harm. The required words and definitions are:

- a) caution or warning—hazardous substance
- b) danger—extremely flammable, corrosive or highly toxic substance
- c) poison—highly toxic

2 Review the Material Safety Data Sheets (MSDS)

All manufacturers are required to provide an MSDS for their products that include hazardous constituents. The MSDS contains information about the product including ingredients, health hazards, proper safety gear and handling, and physical hazards such as flammability, corrosivity and reactivity. The MSDS must also list chemicals that are probable or proven carcinogens, and those that fall under certain regulations such as the Superfund Amendments and Reauthorization Act (SARA 313). Hazardous chemicals that make up 1 percent or more of the product, and carcinogens that make up at least 0.1 percent are required to be listed on the MSDS.

3 Call the Manufacturer

If you have questions that cannot be answered by the written information available to you, contact the manufacturer with specific questions. Not only will you get the answers you need, but you will be letting the manufacturer know that you are interested in the environmental and health effects of its products.

other oxides. Products that are not biodegradable may accumulate in the ecosystem and pose a potential danger of entering plant and animal tissue. Many products are touted as biodegradable, and probably are over time, but it is the speed with which this occurs that is important. Many factors contribute to how readily biodegradable a product will be. For example, fatty acids derived from petroleum degrade more slowly than vegetable sources. Look for cleaners that are readily biodegradable.

■ Does it have a low corrosivity factor?

The pH level of your cleaning product is important to know in order to properly handle and

dispose of the product. The pH can be anywhere from 0 (most acidic) to 14 (most alkaline), where 7 is neutral, the pH of water. A particularly acidic or alkaline compound may cause skin irritations, stains or major burns, and can erode certain surfaces due to its corrosivity. The pH alone is not the single factor which will determine potential hazard, because compounds with similar pH levels can have fairly different corrosivity factors. Check the hazards identification section of the material safety data sheet (MSDS) for likely exposure effects. Look for products with a pH that is closest to 7 and select the mildest product compatible with the area being cleaned. Always ensure that handlers use the appropriate

cleaning tools and protective gear to avoid potential harm.

■ Does it have acceptable VOC levels?

One of the biggest health hazards today is indoor air pollution. In some cases, air inside a building can be as much as 100 times more polluted than outside. If you have ever walked into a building and started coughing from the distinct odor of cleaners, it is likely the volatile organic compounds (VOCs) that are triggering your reaction. VOCs are a class of substances that evaporate easily and react in the atmosphere with sunlight and heat, creating smog and otherwise unhealthy breathing environments.

Millions of tons of VOCs are released into the air. The USEPA

has found that over 900 different VOCs can be found in indoor air alone, from sources such as I & I cleaners as well as “offgassing” from furniture, carpeting and paints. Exposure to high levels of VOCs can cause eye irritation, nausea, vomiting, headaches and impaired memory. VOCs present in some I & I cleaners include formaldehyde and benzene, known or suspected carcinogens, and toluene, a factor in central nervous system dysfunction. D-Limonene and D-Pinene are sometimes used in cleaners and other products as a replacement for petroleum based compounds. These are both derived from natural sources, yet they are also VOCs. Although it may be preferable to use renewable, plant-based substances as opposed to petroleum resources, it does not necessarily make them less of a health risk. Whatever the source of VOCs, look for products that have no more than 10 percent VOC content when diluted for use.

■ **Is it sold in concentrated form?**

Industrial and institutional cleaners purchased as concentrated solutions are beneficial in a couple of ways. Concentration is measured by the amount of water—by weight — compared to other ingredients contained in the cleaning solution. Concentration offers a greater percentage of active ingredients in the product, which may amount to less packaging needed per use. This results in savings for the manufacturer via reduced packaging and related costs, as well as less energy used per package for shipping. The customer may reap cost savings through lower prices charged by the manufacturer or because they are paying for desired product instead of water. The smaller packaging will also conserve storage space as well as minimize solid waste (see packaging section). The intended use will

determine the ideal ratio of water to product. It is extremely important to train janitorial staff on the proper handling of concentrated cleaners, as they can be more hazardous in this form.

■ **Can it work for multiple cleaning purposes?**

Multi-purpose cleaners can be used for a variety of cleaning jobs, usually with just a change of dilution or the type of tool used to do the job. The benefit of multi-purpose cleaners is that one product can replace several different solutions, potentially simplifying the purchasing process as well as employee safety and handling training.

Multi-purpose cleaners may contain a variety of specialty chemicals for removing dirt, brightening, eliminating odors, and disinfecting *(see note). At the same time, this can mean that there are superfluous ingredients in the product. For instance, fragrances and dyes do not improve the cleaning power of the product but may increase the amount of harmful chemicals in the product. Also, if improper dilution rates are used, this may result in too strong a solution being used for certain jobs. Often, milder products can work just as well as more stringent ones if used with a little more “elbow grease” instead of harsh chemicals. Cleaning staff must be

PACKAGING

When evaluating the packaging of a cleaner, there are several attributes that make one product preferable to another. Choose recyclable or reusable containers and buy in bulk because—in this case—it isn’t just what’s inside that counts!

- ❑ **Check with your supplier to see if the product comes in a reusable container.** This will not only reduce the waste stream, but also save energy and raw materials that would otherwise be used to produce new containers.
- ❑ **Make sure the package is recyclable**—more specifically, ensure that it is readily recyclable in your area. The most common containers for I & I cleaners are made of high density polyethylene (HDPE), a plastic commonly recycled, and polyvinyl chloride (PVC), a material that most often is not recycled. Moreover, due to concern over potential toxic releases from additives in goods made with PVC, some companies are phasing out this material in products from toys to athletic shoes. Look for the Society of Plastics Industry symbol—a number surrounded by triangular chasing arrows—to determine what resin the container is made from. The number 2 signifies HDPE content and 3 denotes the use of vinyl and its derivatives.
- ❑ **Check that the packaging has been made out of recycled materials.** Many manufactures already use plastic containers that are made from some amount of post-consumer recycled materials.
- ❑ **Look for products that are sold in bulk,** which often saves on the total amount of packaging needed as well as energy needed to transport the product, since your order will require fewer shipments.



trained as to the proper uses, dilution ratios, cleaning tools and protective clothing required for each cleaning job.

■ **Is it effective when diluted with water at room temperature?**

Concentrated I&I cleaners should work optimally when diluted with room temperature water. This saves the energy that would otherwise be needed to heat the water for product dilution. It is important to educate handlers on the appropriate amount and temperature of water needed for a particular cleaning job. Otherwise, the benefits of selecting environmentally sound cleaning products will be negated by excess product use and energy waste.

Just Say No To These Additives

■ **EDTA or NTA**

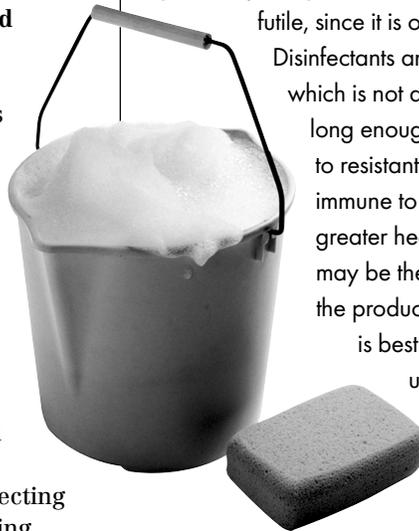
Ethylene diamine tetraacetic acid (EDTA) and nitrilotriacetic acid (NTA) are chelates (substances that bond with metal particles to prevent decomposition of aqueous cleaning products). EDTA is undesirable because of its slow biodegradability and its potential to mobilize heavy metals from wastewater treatment sludges or sediments in surface waters. NTA may be more readily biodegradable than EDTA, but is a possible carcinogen. Moreover, NTA production requires the use of reactants such as formaldehyde, a carcinogen, and hydrogen cyanide, a highly toxic substance.

■ **Petroleum or petrochemical compounds**

Petroleum is a non-renewable resource, so using products derived from a renewable source is generally preferable to depleting one which is limited, provided that

THE DISINFECTANT DEBATE

There is some debate surrounding the necessity of and the benefit to be gained by using disinfectants. Killing bacteria in a public restroom may be futile, since it is only effective until the next person enters the room. Disinfectants and germicides are only effective if used properly, which is not always the case. If the product is not left on a surface long enough, only certain bacteria will die, and this can lead to resistant strains. Similarly, bacteria or virus can become immune to the chemicals over time creating a potentially greater health concern. If large areas must be disinfected, as may be the case in hospitals, great care must be taken to use the products properly. If small areas need to be disinfected, it is best to spot clean the area that must be germ-free, and use a general purpose cleaner elsewhere.



any performance or cost differentials that might exist are acceptable. In addition, the extraction and refining of petroleum can cause more environmental harm than available alternatives. Some petroleum-based solvents such as petroleum distillates are central nervous system depressants, and can also affect the liver and kidneys. Avoid cleaners with petroleum or its compounds.

■ **Chlorine bleach**

Chlorine bleach is often used in cleaners to disinfect and brighten surfaces, but at a potentially high cost. Janitorial workers are at risk for eye and skin damage from splashes that may occur when mixing or using the cleaner. Also, when sodium hypochlorite—the active ingredient in chlorine bleach—is released into the environment, it may react with other elements and create toxic compounds. It is not biodegradable and can kill microorganisms in waste-water treatment plants and water bodies. Sodium percarbonate is one effective substitute without these potential dangers.

■ **Phenolic compounds and glycol ethers**

Phenolic compounds, sometimes used in cleaners as a germicide, are extremely hazardous substances. Not only are they toxic, volatile and corrosive, but they can be harmful to humans via inhalation and dermal absorption and are a suspected carcinogen.

Glycol ethers, such as ethylene glycol and butoxy ethanol, are used in cleaners and degreasers for dissolving oil, wax, and resin. Some are more toxic than others and can cause symptoms ranging from headaches, blurred vision and respiratory irritation to bone marrow and reproductive health damage. Janitorial staff may need to use these products in poorly ventilated areas and are more susceptible to the harmful effects. Many cleaners on the market today are free of glycol ethers; make sure that yours is one of them.

■ **Alkyl Phenol Ethoxylates (APE)**

These compounds, including the surfactant nonylphenol ethoxylate commonly used in detergents, are neither readily nor completely biodegradable. More importantly, when they break down, the chemicals formed are more harmful and persistent than the

Continued on back page

Recommended Industrial and Institutional Cleaners

Based upon information provided by the manufacturers, each recommended industrial and institutional cleaners in this section meets the following criteria:

- Is not toxic to human or aquatic life
- Contains VOC levels under 10 percent by weight when diluted for use
- Is readily biodegradable
- Works optimally in room temperature water
- Has acceptable pH level (between 2.5 - 12)
- Is not made of petroleum or petrochemical compounds
- Does not contain chlorine bleach
- Is free of phosphates and derivatives
- Does not contain EDTA or NTA
- Does not contain phenolic compounds or glycol ethers
- Is free of: arsenic, cadmium, chromium, lead, mercury, nickel and selenium

Some of the products listed may also have these additional advantages:

- Refillable containers
- Recycled content packaging
- Concentrated with 20 percent or less water
- Online accounts for easier purchasing and lower paper use

COMPANY	PRODUCT	PH	% VOC	% WATER (undiluted product)
Alfa Kleen	Tile, Chrome & Porcelain Cleaner	5	0	80
Alfa Kleen	All Purpose Spray	5	0	90
Alfa Kleen	Santizer and Cleaner	9	0	92
The Clean Environment	N1 All-Purpose	4.9	0	89
The Clean Environment	N7 Basin Tub & Tile	11.1	0	85
The Clean Environment	N20 Neutral Degreaser	7	0	89
CFR Corporation	All Purpose Spotter	2.5-3.5	4.5	86
CFR Corporation	Enz-Soil One	10	0	0
DynaChem (Alphen)	H2Orange2 Floor Cleaner	7.61	.015	0
DynaChem (Alphen)	H2Orange2 Bathroom Cleaner	7	.148	0
EnviroSmart Products	APC Concentrate	9.5	4.8	13
EnviroSmart Products	Deodorizing Bathroom Cleaner Concentrate	3	1-2 *	22
EZ Qui Industries	A-Ben-A-Qui (EZ-Task)	8-9	0	52
Gaylord Industries	Formula G-510	9.7	Not Detectible	60
Ipax Cleanogel	Green Unikleen Degreaser and Floor Cleaner	9.5	0	0
Ipax Cleanogel	Unisource Floor Cleaner and Deodorizer	7.3	0	0
KC Products	KC's Citrus	7	5.5 *	26
KC Products	ECO 2000 Multiuse Degreaser/Cleaner	10.0	0	83
National Cemical Laboratories, Inc.	CITROL Industrial Degreaser and Deodorizer	6.5-8	2	0

* VOC content of product when diluted for general purpose cleaning

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Recommended Industrial and Institutional Cleaners (cont.)

COMPANY	PRODUCT	PH	% VOC	% WATER (undiluted product)
Native Solutions	Neutral Cleaner	7-8.5	<2	<10
Naturally Yours	All Purpose	6-8	0.2	45
Naturally Yours	Enz-Away	8	0.3	47
PCI of America: Hurrisafe	9010 All Purpose Cleaner	10.0	0	96
P&D Creative	Magic 555 Industrial Degreaser and Cleaner	10.3-11.5	0	0
P&D Creative	Magic 555 Spot and Stain Remover	9.4-10.2	0	0
Puritan Services	Dazzle Clean	9	0	84
Rochester Midland	Enviro Care All Purpose Cleaner	7	0	0
Rochester Midland	Enviro Care Washroom Fixture Cleaner	4	0	0
Rochester Midland	Enviro Care Tough Job Cleaner	9	0.2-0.6	0
Rochester Midland	Enviro Care Neutral Disinfectant	7	<.01	0
SafeScience	General Purpose Cleaner	9.3-9.7	0	70
SafeScience	Bathroom Cleaner	7.8-8.2	0	70
SafeScience	Floor Cleaner	8.0-8.4	0	78
Shadow Lake	Citra-Solv	7	2 *	0
SOQ Environmental Technology	Ecomate-MPC	10.2	0	0
SOQ Environmental Technology	Ecomate-FN	10.5-11.9	0	0
Spartan Chemical	Damp Mop	7.5	0	80-90
Ultra Shield	Cleaner Concentrate	9.8	1.4	65

* VOC content of product when diluted for general purpose cleaning

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MANUFACTURER CONTACT INFORMATION

Alfa Kleen	714-524-2530	Naturally Yours	888-801-7347
CFR Corporation	800-533-2557 x 232	PCI of America	800-222-1455
The Clean Environment	402-464-0988	P & D Creative	301-797-3503
Dyna Chem	800-281-9604	Puritan Services	800-275-1999
EnviroSmart Products	888-655-3772	Rochester Midland	800-762-4448
EZ Qui Industries	603-668-2829	Safe Science	617-422-0674 x102
Gaylord Industries	800-547-9696	Shadowlake	800-343-6588
Ipax Cleanogel	313-933-4211	SOQ Environmental Technologies	800-345-2892
KC Products	800-927-9442	Spartan Chemical	800-537-8990
National Chemical Labs	800-NAT-CHEM x 266, 271	Ultra Shield	909-673-0091
Native Solutions	360-491-0992		



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— **Recommended Industrial and Institutional Cleaners**

- *What to look for*
- *What to avoid*

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precursors. Some studies have also found that APEs are endocrine disruptors, which can affect hormonal activity of humans and animals.

■ **Phosphates or derivatives**

Cleaners may also contain phosphates, which serve as detergent builders and chelates. Although phosphate is a nutrient for aquatic plants, it can cause an overgrowth of algae when too much is present in the ecosystem. These algae “blooms” block the sunlight that aquatic plants need for photosynthetic activity, and deplete the water of oxygen needed by aquatic life. Despite bans on phosphates in some detergents, they may still be found in I&I cleaners. Alternatives to phosphates, such as sodium bicarbonate and sodium citrate, will impart the useful properties with less environmental risk. So look for cleaning products that are no more than 0.5 percent

CLEAN, SAFE AND GREEN

- **Purchase products that are as benign as possible**
 - avoids unnecessary overexposure to potentially harmful substances
 - reduces the amount of training and mandated personal protective equipment needed
 - eliminates the expense of disposing of excess product or packaging
- **Purchase concentrated and/or multipurpose products in reusable containers**
 - saves storage space and reduces solid waste costs
 - eliminates handling and safety instructions for multiple products
 - simplifies purchasing
- **Train employees on appropriate products, usage, handling and tools**
 - prevents excess product from polluting the environment
 - reduces potential harm to employees using the products
 - lowers costs associated with excess product

phosphates by weight or, better yet, are phosphate-free.

■ **Heavy metals**

Although not present in significant quantities in most I & I cleaners,

heavy metals may appear due to the presence in dyes or from impurities in other ingredients. Heavy metals can contaminate aquatic plants and animals and eventually those further up the food chain.

GREEN

R E P O R T

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Choose

LAWN CARE EQUIPMENT



The average gasoline mower tested by the EPA emits in 1 hour of operation the same amount of hydrocarbons that a 1992 Ford Explorer emits over 23,600 miles!



The average gasoline mower emits over 9000 times more hydrocarbons than its electric equivalent!

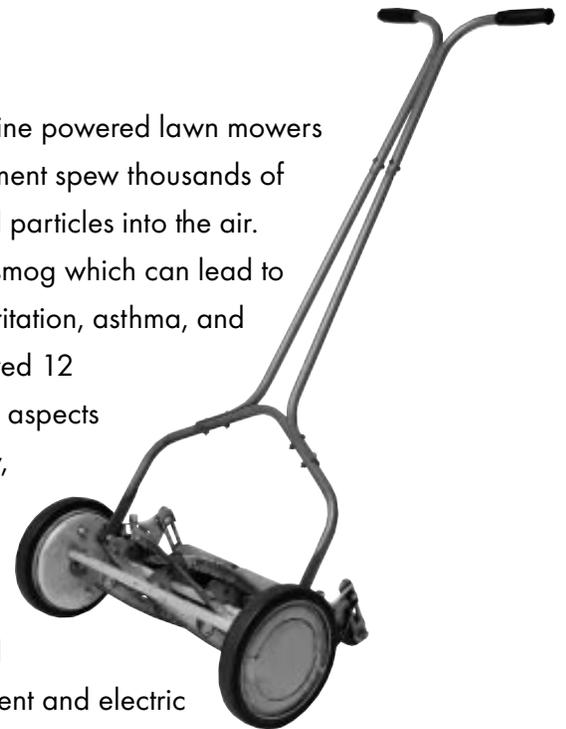


If just 20% of US homeowners switched to electric mowers 84,000 fewer tons of carbon monoxide would be emitted into the air each year!



An electric mower would save the average user 73% in total energy costs!

Each year aging gasoline powered lawn mowers and lawn care equipment spew thousands of tons of polluting chemicals and particles into the air. These pollutants create urban smog which can lead to chronic illnesses such as eye irritation, asthma, and headaches. Green Seal reviewed 12 manufacturers on the following aspects of their products: power supply, engine efficiency, cut size, emission reduction methods, product features and overall costs. The equipment is divided into gasoline powered equipment and electric equipment. Within each section there is a variety of some of the following: riding mowers, walk behind mowers, grass trimmers and brush cutters. Overall, electric equipment receives our Green Buy award based on our criteria and although battery powered equipment may not fit every need, it is an excellent choice when possible.



In Praise of Electric

Electric equipment certainly has an environmental advantage. On average the pollutant emissions from an electric lawn mower can be 5 to 9000 times less than the respective emissions from a gasoline powered mower. Owning an electric mower can also have other clear benefits such as one touch starting and less noise! Because much of the smaller handheld gasoline equipment contains 2-cycle engines, electric is an especially wise choice. Two-Cycle engines are run and lubricated by a mixture of gasoline and oil. While the engines are extremely powerful for their size, they are inefficient in their use of the fuel mixture. Approximately 25%-35% of the fuel escapes from these engines unburned. This allows an excess of hydrocarbons to be released into the atmosphere, contributing to illnesses and environmental problems. One 1996 study by the Electric Power Research Institute (EPRI) showed that the average hydrocarbon emission from a 2-cycle engine is 48.04 grams per

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COMPARE POLLUTION EMISSIONS

	Gasoline mowers Grams/year	Electric mowers Grams/year
Hydrocarbons	1475.0	0.8172
Carbon Monoxide	11425.0	4.572
Carbon Dioxide	24075.0	21240.0
Nitrogen Oxides	50.0	11.28

hour, that is about one quarter of a pound of hydrocarbons for every two hours of use from just one small machine!

Electric mowers do not eliminate pollution, however, they do significantly reduce the emissions overall. As shown in the above box, gasoline mowers emit more pollutants per hour of use under average conditions than the electric mowers under the same conditions. One hour of use of a 3.5 horsepower gasoline mower under average load conditions is compared with one hour of use of a 3.5 horsepower electric mower which draws 12 amperes of current. When calculated, the average growing season is estimated at 25 weeks with one mow per week. The pollutants from the electric mowers are emitted at one source, the power production facility, in grams of pollutant per year. The energy production facilities are under strict guidelines by the EPA to limit their emissions through advanced technology. Clearly it is much easier to limit

the pollution from one source, even if it is a large one, than to limit the emissions from thousands of relatively unregulated small sources.

Recent technology has added features to these new mowers without burdening the consumer with too much extra weight. For example, many electric mowers now have various collection and mulching options, wheel height adjustments, small turning radii and the extremely popular benefit of one touch starting.

As anyone who has walked behind a gasoline mower knows, the noise can be both annoying and damaging to your ears. The average lawn mower is at least 100 decibels; anything over 90 can cause ear damage. While noise levels are only monitored and

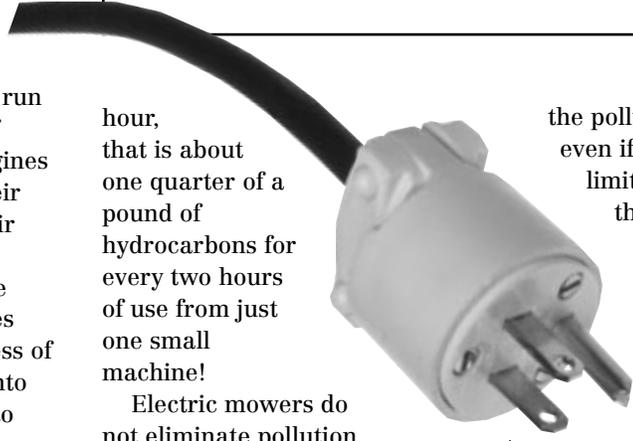
Look for:
1. Electrical equipment with:

- adjustable heights
- mulching options
- batteries (if area is small)

OR

2. Gasoline equipment with:

- a 4-cycle engine
- overhead valves
- meets CARB standards
- mows at adjustable heights
- mulching options



enforced in Europe, noise pollution is a growing concern in North America. Buying an electric mower, not only allows you to mow at almost any hour of the day but also spares your ears, and limits noise pollution. In fact, electric lawn mowers cut noise emissions by 50% to 75%.

The electric mowers of years past operated with long extension cords which were often a safety hazard or a nuisance. Today much of the smaller handheld garden equipment is powered by an extension cord. However, most of the new electric mowers operate with a rechargeable battery pack of two batteries. These batteries

run for approximately 45 to 90 minutes, depending on mowing conditions, before needing to be recharged. Many of the mower batteries can be partially recharged in one hour and completely recharged overnight. The battery pack costs approximately \$140 and needs to be replaced about every 5 years. Consumers have voiced their concerns about battery life and the industry is responding by trying to extend battery life as much as possible.

These batteries contain heavy metals and therefore must be disposed of properly. Most retailers will handle safe battery

disposal if you return them.

As great as these mowers sound they do have some limitations. Currently readily available electric mowers are smaller walk behind models ranging in cutting width from 18" to 33". To finish a mowing job in one charge, the cutting area should be no larger than 1 acre, the grass should not be wet and the height should not be more than 2" taller than your intended cut length. In other words, these mowers are ideal only for small businesses or residential sites. For this reason we have included guidelines for purchasing gasoline mowers. We primarily encourage purchasing electric equipment, however, due to their limitations we have outlined those mowers which have higher efficiencies. The mower industry expects technology to overcome the problems with electric mowers. For those with a mowing area greater than 1 acre, industry expects electric technology to jump to riding mowers in the near future.

Gasoline

Instead of developing electric mowers, many companies are redesigning their current gasoline lawn care equipment for maximum efficiency and minimum pollution. California has 8 of the 10 cities with the worst air pollution in the country. For this reason, the EPA has allowed the California Air Resources Board (CARB) to set higher standards for small non-vehicle engines. Currently, manufacturers must immediately reduce their emissions by at least 30%. A new requirement by CARB mandates that all small "handheld" engines, defined as

continued on page 4

MAINTAINING YOUR LAWN OR GARDEN

Several simple techniques can improve the overall quality of your lawn and garden area and help to maintain your local environmental quality.

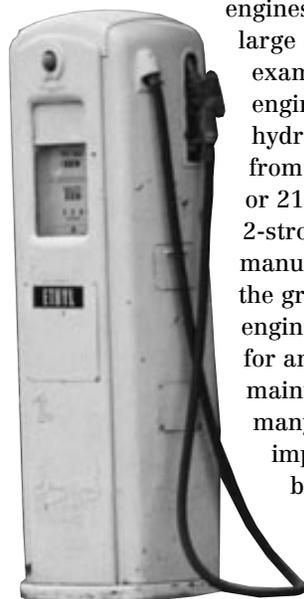
- Have your county agricultural board type your soil and make suggestions about the appropriate type of grass for your climate and soil pH.
- Cut grass no lower than 2.5". Crab grass is choked out the most effectively at 3.5". Taller grasses can have deeper roots and are less susceptible to erosion, drought and pests.
- Water your lawn just before sunrise or after dark to cut down on evaporation.
- Leaving your lawn clippings on the lawn provides extra nutrients for the soil to absorb, rather than extra bags for the garbage truck to carry.
- Ask your lawn service to use organic fertilizers. They provide longer lasting results because they degrade much more slowly.
- Ask your lawn service to consider natural pest control. This reduces costs for commercial pesticides as well as the impacts associated with spraying highly toxic chemicals on your property. In 1997, the U.S. Geological Survey found that 95% of stream samples taken from across the country contained at least one widely used lawn pesticide.



Gasoline
continued from page 3

0-60 cubic centimeters of engine displacement, must reduce their hydrocarbon and nitrogen oxide emissions 74% by the year 2010. For engines over 60 cubic centimeters, manufacturers must reduce uncontrolled emissions of hydrocarbons and nitrogen oxides by 67%. These same strict standards are likely to be adopted across the country.

Most manufacturers have switched to the more efficient 4-cycle engine for larger machinery. The 4-cycle engine has become known as a cleaner and a more efficient engine. Some manufacturers are adapting their designs of the 2-cycle engine to



run as much as 30% more efficiently than previous models.

Clearly, more stringent emissions standards are causing large advances in engine efficiency. EPRI found that, depending on maintenance, engines can operate with a large emissions range. For example, gasoline 4-stroke engines can range in hydrocarbon emissions from 10 to 147 grams/hour or 21 to 107 grams/hour for 2-stroke engines. The manufacturers can reduce the gray area by designing engines to be easier to care for and cheaper to maintain. Recognizing this, many manufacturers are improving their product by redesigning the combustion chamber, re-calibrating the ignition and fuel chambers as well as changing to overhead valves. Even something as simple as an oil

filter will improve the overall running quality of the product, while at the same time reducing the product's environmental impact.

What to do with your old mowers

Utilities across the country have set up incentive programs for businesses and homeowners to trade in their old gasoline powered lawn mowers and lawn care equipment for discounts on the new electric equipment. These discounts range from \$50 to \$150 and often the retail stores will also offer lower prices on the new units. Programs have been supported by utilities in cities such as Sacramento, New York City, and Washington DC. Contact your local utility company to inquire about future programs for disposal of your old gasoline equipment and for incentives for the newer electrical equipment.

YOU COMPARE!

In 1996 the Electric Power Research Institute conducted a study, "The Environmental and Energy Benefits of Cordless Electric Lawn Mowers." This study compared uses of electric and gasoline mowers and tested the engines for various pollutants under average load conditions. These conditions limited the stresses put on the engine to what was deemed as common usage conditions. Below you find the yearly costs of either a 4-stroke, 3.5 horsepower gasoline mower or a comparable electric mower. You will see that a gasoline mower costs twice as much over a ten year period. (Assumed is an average US growing season of 25 weeks with a one hour long mow per week.)

TYPICAL GASOLINE POWERED MOWER

Initial Cost: \$160
Gas Cost: \$7/year
Oil Cost: \$2/year
Yearly tune up: \$65/year

10-Year Cost: \$835

TYPICAL ELECTRIC MOWER

Initial Cost: \$340
Electricity Cost: \$5/year

10-Year Cost: \$390

Green Buys—Electric Equipment

MANUFACTURER	POWER	CUT SIZE	MSRP	FEATURES	CORDLESS?
Walk Behind Mowers					
Black & Decker CMM Line	12-24 Amps	18",19"	\$350-400	Adjustable Height Mulching Options	YES
Black & Decker MM Line	12-18 Amps	18",19"	\$165-220	Adjustable Height Mulching Options	NO
Black & Decker LM Line	6.5 Amp	18"	\$115	Adjustable Height Mulching Options	NO
Lawn Boy Electric Series	24-120 Volts	18"	\$229-399	Adjustable Height Mulching Options	Some
Toro Carefree Recycler Line	36-120 Volts	18"	\$279-499	Adjustable Height Mulching Options	Some
Grass Trimmers					
Black & Decker GH 400 Grass Hog™	4.3 Amp	12"	\$56	Automatic Feed Spool™ Edge Guide Rotating Head	NO
Black & Decker CST 1000 Cordless Grass Hog™	12 Volts	9"	\$110	Automatic Feed Spool™ Edge Guide Rotating Head	YES
Black & Decker ST Line	1.8-3.6 Amps	9-12"	\$22-45	Edge Guide Rotating Head	NO
Toro Electric Trimmers	2-3.7 Amps	8-14"	\$25-65	Bump Feed	NO
Toro Battery Trimmers	6-12 Volts	7,10"	\$60-100	Bump Feed	YES
Hedge Trimmers					
Black & Decker Hedge Hog Line™	2.6 Amps	18",22"	\$62-74	Auto Stop Blade System™ Up to 3/4" cut capacity Lock on/Lock off	NO
Black & Decker HT Line	2.4-2.6 Amps	16-22"	\$39-59	Auto Stop Blade System™ Up to 3/8" cut capacity Lock on/Lock off	NO
Black & Decker TR Line	2.0-2.6 Amps	13-18"	\$29-39	Up to 3/8" cut capacity Lock on/Lock off	NO
Black & Decker CHT 600	12 Volts	16"	\$110	Auto Stop Blade System™ Lock off	YES
Mantis Little Wonder	120 Volts	16-30"	\$189-249	2 handed safety switch	NO
Toro Electric Hedge Trimmers	2.6-3 Amps	18-24"	\$40-63	Auto Stop Anti-Vibration	NO

MANUFACTURER CONTACT INFORMATION

Ariens	1-920-756-2141	Lawn Boy	1-800-526-6937
Black & Decker	1-800-762-6672	Mantis	1-800-366-6268
Dixon Industries ...	1-800-264-6075	MTD/Cub Cadet	1-800-528-1009
Exmark Mfg.....	1-402-223-6300	Simplicity Mfg.....	1-414-284-8669
Honda	1-800-426-7701	Snapper	1-800-935-2967
John Deere	1-888-669-7767	Toro	1-800-595-6841

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Honorable Mentions—Gasoline Equipment

MANUFACTURER	HORSEPOWER	CUT SIZE	MSRP	FEATURES	EMISSIONS REDUCTION METHOD
Riding Mowers					
Ariens EZR Line	15,16 HP	40,48"	\$3649-4199	Adjustable Height Mulching Options	4-Cycle Overhead valves
Ariens RM Line	8,8.5,13 HP	28,30,32"	\$1849-2149	Adjustable Height Mulching Options	4-Cycle Overhead valves
Dixon Industries ZTR Line	10.5-22 HP	42-60"	\$2425-8645	Adjustable Height Mulching Options	4-Cycle Overhead valves
Exmark Mfg. Turf Ranger Line	22 HP	52,60"	\$7810-8040	Adjustable Height Mulching Options	4-Cycle Overhead valves
Exmark Mfg. Lazer Z Line	18,22,25 HP	52,60"	\$7810-9150	Adjustable Height Mulching Options	4-Cycle Overhead valves
Exmark Mfg. Lazer Z HP Line	17,18 HP	44,48"	\$6920-7250	Adjustable Height Mulching Options	4-Cycle Overhead valves
Exmark Mfg. Explorer Line	20 HP	44,52"	\$9180-9380	Adjustable Height Mulching Options	4-Cycle Overhead valves
Honda Riding Line	11 HP	30"	\$1699-2199	Adjustable Height Mulching Options	4-Cycle Overhead valves
John Deere GX Line	13 HP	30"	\$1799	Adjustable Height Mulching Options	4-Cycle Overhead valves
John Deere F 500 Line	14,17 HP	38,48"	\$4995-5570	Adjustable Height Mulching Options	4-Cycle Overhead valves
John Deere F 900 Line	22-28 HP	60,72,76"	\$14125-17641	Adjustable Height Mulching Options	4-Cycle Overhead valves
John Deere F 1125	35.9 HP	60,72"	\$21520	Adjustable Height Mulching Options	4-Cycle Overhead valves
John Deere Z-Trak	20,25 HP	48,54,60"	\$8345	Adjustable Height Mulching Options	4-Cycle Overhead valves
John Deere F 725	20 HP	48,54"	\$10500	Adjustable Height Mulching Options	4-Cycle Overhead valves
Simplicity Mfg. Z-Turn	14,16 HP	38,44"	\$3499-3999	Adjustable Height Mulching Options	4-Cycle Overhead valves
Snapper Yard Cruiser HZS-BVE,KVE	14,15 HP	33,38,42"	\$3000-3799	Adjustable Height Mulching Options	4-Cycle Overhead valves
Snapper Rear Engine BVE,KVE	14,16 HP	33,42"	\$1999-2699	Adjustable Height Mulching Options	4-Cycle Overhead valves

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Honorable Mentions—Gasoline Equipment

MANUFACTURER	HORSEPOWER	CUT SIZE	MSRP	FEATURES	EMISSIONS REDUCTION METHOD
Walk Behind Mowers					
Ariens DLM Line	6 HP	21"	\$729	Adjustable Height Mulching Options	4-Cycle Overhead valves
Ariens SLM	5.0,5.5 HP	21"	\$469-599	Adjustable Height Mulching Options	4-Cycle Overhead valves
Ariens DLM Swivel	5.5,6 HP	21"	\$659-849	Adjustable Height Mulching Options	4-Cycle Overhead valves
Ariens DLM Commercial	6.0 HP	21"	\$799-969	Adjustable Height Mulching Options	4-Cycle Overhead valves
Cub Cadet MTD Wide Cut Mowers	8.5 HP	33"	\$1379-1599	Adjustable Height Mulching Options	4-Cycle Overhead valves
Exmark Mfg. Metro Line	8.5-15 HP	32,36,48	\$2190-2990	Adjustable Height Mulching Options	4-Cycle Overhead valves
Exmark Mfg. Metro HP Line	14-17 HP	36,48,52	\$3220-3970	Adjustable Height Mulching Options	4-Cycle Overhead valves
Exmark Mfg. Metro 21 Line	6.5 HP	21	895-1049	Adjustable Height Mulching Options	4-Cycle Overhead valves
Honda Residential Line	5.5 HP	21"	\$315-529	Adjustable Height Mulching Options	4-Cycle Overhead valves
John Deere GS Line	13-17 HP	36-54"	\$2345-4135	Adjustable Height Mulching Options	4-Cycle Overhead valves
John Deere JX Line	6 HP	21"	\$799-949	Adjustable Height Mulching Options	4-Cycle Overhead valves
John Deere HD Line	14,17 HP	36,48,54"	\$4785-5405	Adjustable Height Mulching Options	4-Cycle Overhead valves
John Deere J Series Steel	6 HP	21"	\$359-499	Adjustable Height Mulching Options	4-Cycle Overhead valves
John Deere J Series Aluminum	6 HP	21"	\$599-939	Adjustable Height Mulching Options	4-Cycle Overhead valves
John Deere Sabre Line	6 HP	21"	\$329-439	Adjustable Height Mulching Options	4-Cycle Overhead valves
Snapper Mulching Line MCR-KWV	5 HP	21"	\$599	Adjustable Height Mulching Options	4-Cycle Overhead valves
Snapper AIR Line FRP-TV	6 HP	21"	\$569	Adjustable Height Mulching Options	4-Cycle Overhead valves
Snapper Hi Vac Line P21-TV, CP24-RV	6,6.5 HP	21"	\$539	Adjustable Height Mulching Options	4-Cycle Overhead valves
Snapper Rear Discharge CLP-RV	6.5 HP	21"	\$879	Adjustable Height Mulching Options	4-Cycle Overhead valves

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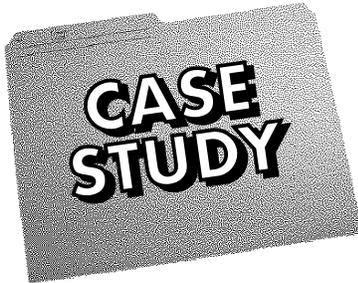


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 Equipment**
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- **Honorable Mention
 Gasoline Lawn
 Care Equipment**



UNITED STATES POSTAL SERVICE

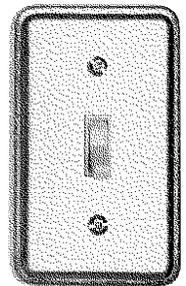
During the summer of 1997 the United States Postal Service began a test project to review electric lawn care equipment. Offices in North and South Carolina were selected to receive the equipment which included lawn mowers, grass trimmer, and hedgers. The USPS initially looked at electric equipment as a way to cut down on storage of flammable materials, however, the USPS has discovered at the same time that the equipment is light weight, easy to use and easy to care for. Tim



Houston of the Columbia district of the USPS states that “the initial results were so encouraging that we issued a recommendation to proceed nationwide”. The Postal Service has now entirely cut out the costs of maintenance, gasoline and oil, saving each office on average \$50 to \$75 per piece of equipment. Although the Postal Service can receive a government discount on the equipment, the discount is similar to those rebates offered by utility companies across the country.

OCCUPANCY SENSORS

One of the most overlooked energy-saving tools in the work place is the light switch. Lighting accounts for 30 to 50% of a building's energy use, or about 17% of total annual US electricity consumption. Simply turning off unneeded lights can reduce direct lighting energy consumption up to 45%. Reducing lighting electricity usage reduces your energy cost and lessens the environmental impacts associated with electricity generation.



In this report, we discuss one approach to reducing office lighting energy consumption: occupancy sensors.

These are inexpensive and effective devices that can quickly and easily be installed on a wall or ceiling. A list of features to look for when you shop for these devices is included. We have gathered information from the major sensor manufacturers and identified a number of devices that satisfy these criteria. We also explore other options for turning off unused lights and other equipment.

Making Sense of Sensors

Occupancy or motion sensors are devices that turn lights and other equipment on or off in response to the presence (or absence) of people in a defined area. Some sensors also control lighting based on the amount of daylight available in

A complete sensor unit consists of a motion sensor, an electronic control unit, and a controllable switch/relay.

their coverage area. Most available sensors are designed to function independently or in parallel with other sensors for large areas.

Originally developed for use with security systems, occupancy sensors have been refined and enhanced to control lighting and HVAC in commercial and residential spaces. More sophisticated sensor units now offer users a variety of adjustment capabilities; manufacturers have

continued on page 2

Making Sense of Sensors
continued from page 1

also introduced sensors that can be integrated into a building's automation and control system.

Sensors have become more widely used in the last five years as the devices have become more reliable and as building automation and energy savings have become more prominent. Where there are utility rebates available, sensors can pay for themselves in less than one year, but most pay for themselves in two to three years without rebates.

Units are available in wall-mounted switch configuration for use in offices or other small areas and in ceiling- and wall-mounted configurations for large, open areas. There are also sensors specifically designed for bathrooms, stairwells and hallways.

Although they are commonly referred to as "sensors", a complete sensor unit consists of a motion sensor, an electronic

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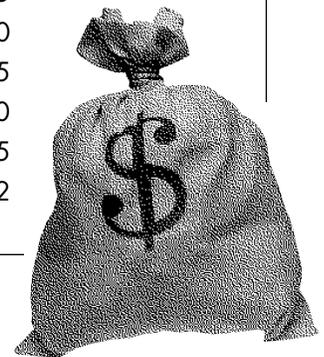
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Can you really save with sensors?

Here's an example: In Green Seal's building, lights are left on in the bathrooms on every floor for 24 hours a day. If sensors were installed, the on-time would be reduced by at least 12 hours, a 50% savings. At an estimated 500 watts per bathroom and 5 cents per kWh, the annual savings works out to be \$219, or enough to buy 7 more sensors. The chart below shows the possible reduction in on-time gathered by MyTech Corp. in a survey of a large corporate headquarters.

Area type	% Reduction
Locker room	65
Large work room	55
Rest room	50
File room	45
Small work room	40
Corridors	25
Small offices	22



control unit, and a controllable switch/relay. Some units also incorporate an optional daylight (or light level) sensor. The motion detector senses motion and determines the occupancy status of an area. It also has a timer which signals the electronic control unit after a set period of inactivity. The control unit uses the signal from the sensor unit and other inputs, (for example, input from a light level sensor), as the basis on which to activate the switch/relay to turn on or off the lights and/or other equipment.

Where Should Sensors Sense?

Generally, the most effective areas for sensors are areas that are not frequently used, areas with irregular use patterns or areas where lights are inadvertently left on, *e.g.*, conference rooms or

reading rooms.

Other targets include places where users are not often in control of the lighting/equipment or where the controls are not visible, such as copier rooms, bathrooms or storage areas. In commercial settings, individual offices, hotel and office conference rooms, library stacks, warehouses, store rooms and bathrooms tend to have the most unoccupied periods. The lights in these spaces are also more likely to be left on overnight.

To identify other potential areas for sensors, start where lights are often on, but where there is no continuous or permanent user presence. A rule of thumb is that areas with incandescent lighting usually yield more significant reductions and a faster payback.

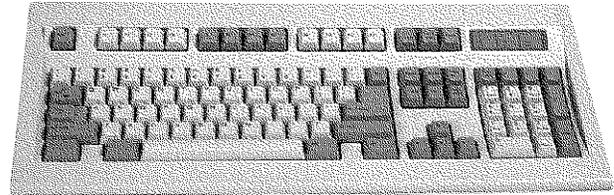
What Kind of Sensors Should You Use?

Device sensitivity/accuracy and capability for multiple adjustments are the two most important characteristics to look for in a sensor. Selection should be a function of the type of activity(ies) in the sensing area. Distinct types of motion that occupancy sensors typically key on are: desktop-type motion such as page turning or mouse and keyboard motion, torso motion such as reaching for objects, and whole body-type motion, such as walking. Depending on type and

sensitivity setting, sensors can also respond to false signals (or “false triggering”), such as air movements from HVAC vents, or motion on the desktop due to HVAC flows, or the movement of warm air in front of a sunny window.

Selection should be a function of the type of activities in the sensing area.

Keep in mind that studies have shown that lighting controls work only when they are appropriate and unobtrusive. Occupants have disabled or defeated lighting controls when they interfered with their daily routine, and there are specific areas such as hallways or stairs that should not be controlled by sensors.



Available Types of Sensor Technologies

■ Infrared or Passive Infrared (PIR)

These sensors are tuned to detect infrared radiation (heat) from humans. A lens divides its coverage areas into pie-shaped segments and positive detection occurs when the sensor “sees” the motion of infrared radiation from one wedge to the next. IR devices are considered “passive” because they only detect radiation.

Advantages: highly resistant to false triggering, quite inexpensive, do not emit ultrasound or microwaves.

But: they are strictly line-of-sight devices, cannot “see” over partitions; range for small motion is dependent on the lens’ focal length. At longer distances, the lens requires larger movements in order to register occupancy.

Recommendations: an excellent choice for areas with little or no obstructions, like library stacks, hallways and smaller offices and conference rooms.

■ Ultrasonic or Ultra Sound (US)

These sensors contain both an ultrasound generator and receiver. The ultrasound generator emits sound waves and any motion towards or away from the sensor causes a change in the reflected frequency.

Advantages: sensitive to almost all types of motion, no coverage gaps, and can detect movements that are not in their line-of sight.

But: they tend to be more expensive than PIR sensors, and are more prone to false signals; obstructions can reduce their effectiveness. Care must be taken to avoid overlapping sensors. There have been reports that sensors operating in the 25 to 27 kHz range may interfere with hearing aids.

Recommendations: an excellent choice for larger areas, open offices, hallways, conference rooms, bathrooms and unusually shaped areas.

■ Microwave

These sensors contain both a microwave generator and receiver. Sensors emit microwaves and detect movements through changes in the reflected frequency (most automatic door openers are microwave-operated).

Advantages: quite sensitive and usually have good coverage.

But: very little data currently exist on their reliability or operating cost.

Recommendations: specialized applications only.

■ Audio

These sensors contain a microphone that “listens” for sounds made by occupants or operating equipment.

Advantages: can be activated by voice, fairly inexpensive, do not emit sound or microwaves; they are not defeated by partitions.

But: they may mistake external sounds such as door closing, people walking, or even phone ringing as signs of occupancy.

Recommendations: a good choice in unusually shaped areas.

Choosing Sensors

For most average-sized offices, wall switch-type PIR or US sensors will perform well. However, care should be taken in cases of unusual shaped rooms where the switch location does not provide the sensor with a good field-of-view (an "L" shaped room, for example); especially where the sensor can be easily obscured. For larger spaces

Sensors must have an indicator to alert occupants when they are on or about to switch off.



such as an open office area, conference rooms or library stacks, wall or ceiling mounted PIR, ultrasonic or combination sensors should be considered, and more than one sensor unit may be necessary. The sensor/switches combinations generally offer better coverage areas as well as ability to handle larger electrical loads.

Use the criteria below to select sensors. For use in small individual offices, the coverage area is not as important as the feature requirements.

■ **Compatibility:** Wall switch sensors and control units must be able to switch electronically-ballasted

fluorescent lamps. (If you plan to upgrade or install building automation in the near future, look for sensors with outputs that are compatible with building automation systems).

■ **Daylight-Level Equipped Sensors:** Daylight or light level equipped sensors should offer users override capabilities.

■ **Failure Mode:** Sensors must be designed so that the equipment they control remains on in case of sensor failure.

■ **Indicators:** Sensors must be equipped with an audio or visual indicator to alert occupants whenever sensors are on, and provide warning prior to switching off.

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Available Types of Sensor Products

■ Hybrid or Combination Sensors

Units combine two or more technologies to minimize false detection, usually PIR and ultrasonic, or PIR and audio.

Advantages: can be very fool-proof, allowing wide coverage and applications.

But: they can be more expensive (for small area applications), and may require more adjustments since sensors contain more than one sensing unit.

Recommendations: a good choice for large open areas and areas with unusual occupancy patterns or work requirements.

■ Integrated Daylight Sensors

A combination of PIR or ultrasonic sensors with a light-level sensor.

Advantages: can be wired to a dimming circuit to control room

lighting based on available light and occupancy.

But: they can be difficult to adjust and require a dimming ballast or special wiring.

Recommendations: good for areas that receive large amounts of daylight.

■ Wall Switch Sensors

A PIR, ultrasonic or combination/hybrid sensor and control circuitry packaged into one unit, sized to fit in a standard wall box.

Advantages: small, inexpensive and easy to install.

But: their range can be limited, and depending on the location of the switch, they can easily be obscured.

Recommendations: good for smaller meeting rooms, individual offices and store rooms.

■ Wall or Ceiling-Mounted Sensors

PIR, ultrasonic or hybrid sensors designed to be mounted separately from the control unit(s), usually in high locations.

Advantages: can cover wide areas effectively; switching units can control a variety of equipment.

But: they tend to be more expensive and often necessitate rewiring.

Recommendations: a good choice for large areas.

■ Specialized Sensors

PIR or ultrasonic sensors designed specifically for bathrooms, hallways and stairwells.

Advantages: specifically designed for these spaces.

But: rewiring may be necessary if certain lights need to stay on.

Recommendations: excellent for these areas.

Recommended Products

Based on manufacturers' provided information, and the criteria listed above, Green Seal selected the following products as "Green buys." These were selected solely on information provided to Green Seal by their manufacturers. Green Seal has not tested or otherwise verified these claims.

COMPANY	MODEL #	TECH	COV. AREA (SQ FT)	WARRANTY (YRS)	LIST PRICE* (\$)
SMALL AREA WALL SWITCHES					
MyTech Corp 512-450-1100	LP-2	PIR	900	5	N/A
Novitas, Inc. 310-568-9600	01-200	PIR	300	5	57.00
Sensor Switch 203-265-2842	WSDx	PIR	800	5	47.60
Technology Design Center, Inc. 610-539-4210	LO300WS	US	800	3	55.00
Unenco 510-337-1000	SOM-500	PIR	1000	5	73.00
The WattStopper 408-988-5331	Wx-277	PIR	900	5	65.00
LARGE AREA WALL SWITCHES AND SENSORS					
Leviton MFG 800-323-8920	6775x	PIR	2700	5	92.00
Novitas, Inc. 310-568-9600	01-083	US	2100	5	122.00
MyTech Corp. 512-450-1100	LAS-2200SF	US	2200	5	N/A
Sensor Switch 203-265-2842	WV-PDT	PIR	2000	5	77.00
Unenco 510-337-1000	C-500-2000	US	2000	5	99.00
The WattStopper 408-988-5331	W-2000x	US	2000	5	100.00

* For large area sensors, sensor prices may not include price of switching units.

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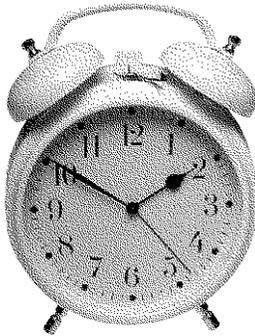
Choosing Sensors
continued from page 4

■ **Manual Controls:** Look for wall switches with manual control capabilities.

■ **Minimum Load:** Sensors must be rated for 120, 240 or 277 volts operation, and have a minimum load rating of 600 W @ 120 V, or 1200 W @ 277 V.

■ **Timer Settings:** Look for an adjustable time delay period. At a minimum, the unit should have time delay periods from 30 seconds to 15 minutes.

Look for a sensor with an adjustable time delay period.



Coverage for Large Areas

SENSOR TYPE/CATEGORY	TYPICAL MOUNTING HEIGHT (ft.)	MINIMUM COVERAGE AREA (ft ²)
Wall Switches	3.5	300
Wall Mount	8	900
Ceiling Mount	8 to 10	1500
Hallway	8 to 10	100 linear ft
Combination - Wall Mount	8 to 10	1200
Combination - Ceiling Mount	8 to 10	1800

■ **Warranty:** Look for a repair or replacement warranty covering a minimum period of three years after installation.

■ **Coverage:** For applications other than small, individual offices, bathrooms or store rooms, you should look for the coverage in the chart above.

Other Things to Consider

Your savings will vary depending on the area size, type of lighting and occupancy pattern. Manufacturers claim that in some applications, savings can approach 75%. The California Energy Commission estimates that typical savings range from 35% to 45%.

continued on page 7

SUCCESS STORY

(From **Lighting Management & Maintenance**, February 1996 — Reprinted with author's permission)

In 1991, the State of Connecticut began an energy-efficiency program for state-owned office buildings in partnership with Northeast Utilities. One of the buildings selected for this program was #55 Elm St. in Hartford. This 188,000 square foot building houses the offices of the State's Attorney General, Treasurer and Comptroller. About 2/3 of the building is open office space and

its lights often stayed on for 14 to 16 hours a day, shut off only when the building was totally empty.

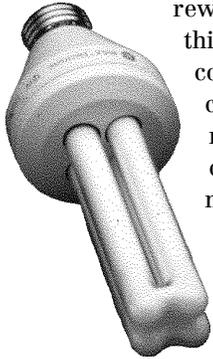
The State used a contractor to outfit the building with hybrid occupancy sensors (dual technology PIR/microphonic). The installation was carried out over a six-week period. All lights not intended for 24 hour use were wired to be controlled by occupancy sensors. Because of the building's open space, sensors were selected over other control methods such as computer-control or timed systems.

With a reported annual savings of \$24,000 in direct electricity cost, the project paid for its \$51,000 cost in just over two years. Just as important is the fact that the sensors were readily accepted by the building's occupants — high level lawyers and executives — without complaints.

For more information, contact the Connecticut Department of Public Works.

Other Things to Consider
continued from page 6

However, savings can be achieved without the use of sensors. If the occupancy pattern in an area is regular and predictable, a more effective choice is a timer system to turn lights and other equipment on and off at predetermined times. Also, the installation of sensors may not provide a payback if extensive rewiring is required. In this case, more effective conservation may come from lighting retrofits or other conservation measures.



Two important issues in the use of sensors with fluorescent lamps are ballast compatibility and the possibility of reduced lamp life. While all switching units are compatible with incandescent loads, some units are not compatible with electronic ballasts — check with manufacturers about the particular model(s) you have selected. Regarding reduced lamp life, the issue is not so clear-cut. Under most applications, the switching actions are long enough (>15 minutes) so that this is not a serious issue. But under certain situations, the useful life of compact fluorescent lamps and certain lamp-ballast combinations can be shortened by frequent on-off cycles.

Other Resources

- California Energy Commission
916-654-5200
Lighting Research Center/RPI
518-276-8716
- Rocky Mountain Institute/E
Source 303-440-8500
- US EPA Green Lights Program
202-775-6650

The development of total building control systems may affect your installation of sensors. These computerized systems use sensors and actuators to monitor entire buildings and regulate their lighting, HVAC and other equipment. Standardized software and control/sensor modules are now being developed for use with these control systems. If your building is scheduled for automation, it may be necessary to use sensors that can be integrated into the proposed system. Additionally, the upcoming revision of ASHRAE standard 90.1, which will include requirements for building lighting and equipment controls, will affect new and retrofit buildings.

ANNOUNCEMENT

Trane Chillers Earn the Green Seal of Approval

Green Seal has certified the Earth•Wise™ CenTraVac® chillers, available in 300–1400 tons capacity, made by The Trane Company. These electric chillers are the first to receive the Green Seal of Approval. They are among the most energy efficient chillers on the market today, offering considerable savings on cooling bills, and reducing the air and water pollution associated with extracting and burning fossil fuels for electricity. Chillers, or chilled-water air-conditioning systems, typically handle cooling tasks in large commercial and industrial buildings.

To earn the Green Seal, these Earth•Wise™ CenTraVac® chillers had to meet Green Seal's rigorous

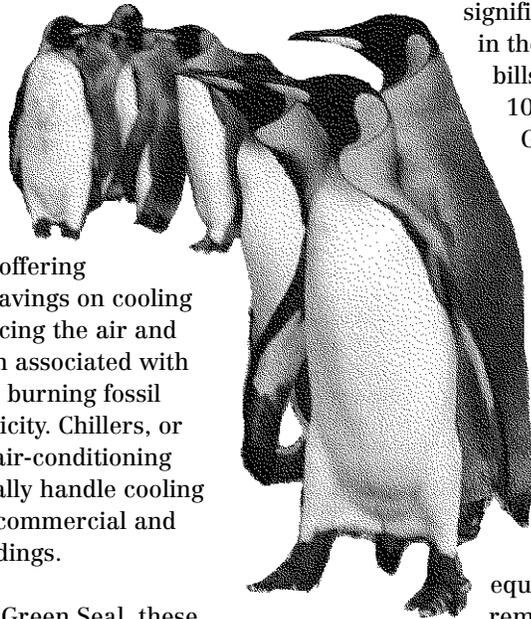
environmental standard for electric chillers. Central to the standard are requirements for high energy efficiency levels and minimal ozone depletor releases. The Earth•Wise™ CenTraVac® chillers, with their low leakage rates and high energy efficiency, offer large commercial and

industrial buildings significant savings in their cooling bills — up to 10% annually.

Green Seal projects that if the Earth•Wise™ CenTraVac® chillers were used widely, the annual reduction in electricity use would be the

equivalent of removing

200,000–300,000 cars from the road every year.





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ANSWERS TO YOUR QUESTIONS

What Is Green Seal Certification?

Green Seal sets environmental standards on a category-by-category basis. A study of the environmental impacts of products within a specific category is conducted, encompassing the manufacturing process, use of the product and its ultimate disposal. Product performance is examined in concert with environmental attributes. After the initial study, proposed standards are circulated for comment among manufacturers, trade associations, environmental and consumer groups, government officials and the public at large. Following a formal review of comments, Green Seal publishes the final standards

and allows the use of its certification mark on products found to meet or exceed them.

Green Seal standards are periodically reviewed and updated to incorporate advances in technology and industry practices. Certified products are monitored annually to ensure continued compliance with Green Seal standards.

Who Are Environmental Partners?

Green Seal's Environmental Partners are businesses, government agencies and other organizations that have committed

to taking product specific environmental impacts into account when making their purchasing decisions. Green Seal provides detailed, up-to-date discussions of environmentally responsible products and specific sources for buying them. The *Choose Green Reports* show *how* various products you buy may damage the environment, *what* products are better for your health and the environment, and *where* you can obtain them.



ARCHITECTURAL PAINTS

- Architectural coatings contribute approximately 9 percent of total VOCs from consumer and commercial products, according to EPA estimates
- In a large-scale study for the U.S. Army's Aberdeen Proving Ground, Green Seal found that paints used at the facility that met Green Seal environmental criteria cost, on average, \$1.76 less per gallon than those that did not
- Stricter regulations and increased environmental concern have led to over a 10 percent increase in the purchase of water-based paints from 1990 to 1997, while oil-based paint purchases have decreased by 10 percent in the same time period

Architectural paint is a product that is used in and on buildings everywhere. Paint serves important functional and aesthetic purposes, but has the potential to cause both health and environmental impacts. Low level exposure to paint may irritate or burn the eyes, nose, throat and skin and cause reactions such as headaches, dizziness or nausea. These symptoms are generally mild and will subside once the immediate exposure has ceased. However, high levels of exposure to some of the elements in paint, even for a short period of time, can cause severe and lasting impacts such as kidney or liver damage or respiratory problems. Substances found in some paint, such as formaldehyde and benzene, are carcinogenic while others, such as heavy metals and phthalates, are human and ecosystem toxins.

As a protective covering, paints help to maintain surfaces and protect them from weather, wear and tear and regular cleaning. As a decorative enhancement, the

color of paint can be used to convey a company's image and can influence the energy level of people inside. These services are equally critical to a place of business as building maintenance. Although paint selection is not likely a daily endeavor, if paint purchases are made without consideration for potential human health and ecological impacts, even its periodic use can cause harm. Health and safety concerns may also have business impacts if paint products create the need to cease normal business activity while a paint job takes place or if they cause productivity declines due to worker illness.

In this issue, we discuss the potential environmental and health impacts of ingredients commonly found in architectural paints, outline the environmental criteria to use in paint selection, and offer tips for handling any excess product. We surveyed paint manufacturers to gather information on lower impact paints and evaluated the data collected against environmental

criteria in the Green Seal Environmental Standard for Architectural Coatings (GS-11). The result of this survey and evaluation is the list of recommended paints included in this report. Consider the following information when selecting your interior and exterior paints, and reap the rewards of a cleaner indoor and outdoor environment.

Performance Matters

All paints need to perform well, both during and after they are applied. The paint should flow and level well, cover in one coat, and dry in a reasonable amount of time. When the job is complete, the coating should be easy to maintain and be able to withstand the elements. Performance is generally described according to three basic attributes: hideability, wearability and scrubability. These terms are defined below, along with likely implications of poor performance in these areas (see table).

If the paint selected does not perform well and meet performance expectations, then the area will likely need to be repainted sooner than usual. This

PERFORMANCE CHARACTERISTIC	POTENTIAL ENVIRONMENTAL IMPACT
Hideability Opacity, or the ability of the paint to cover the underlying surface.	Determines how much paint will need to be applied to the surface. Poor hideability means more paint will need to be applied. Repeated application presents a waste of money and time. If a "green" paint was used, having to use more paint counteracts some of the environmental benefits.
Wearability Durability of the painted surface when exposed to normal wear and tear.	If subject to normal use, paint should protect the surface. If the paint does not hold up, it will require more frequent painting, which defeats the purpose of using environmentally sound paint.
Scrubability Extent to which the painted surface will be able to withstand abrasion from regular cleaning.	If the surface cannot stand up to regular cleaning, it may need more frequent repainting, particularly if the area will be seen by people outside the company/facility.

rework creates environmental and health impacts because of the additional resource use and chemical releases into the environment. Paint can meet standard performance parameters, but still not satisfy "quality of life" criteria, such as a safe working environment, clean air and water, and healthy ecosystems. Exposure to paint can affect the health of people applying it as well as those working close to the area being painted. Poor employee health can damage a company's productivity and possibly its reputation. There are many products on the market that can meet both environmental and performance goals, so it is possible to make a change without sacrificing quality or price.

Canned Goods (or "Bads")

All paints are comprised of various components that give the products substance and performance attributes that consumers look for in architectural coatings. These can be divided into the following categories:

■ **Solvents** — substances that maintain paint in proper

consistency and evaporate after application.

■ **Pigments** — compounds which lend both color and opacity to the product; the most prevalent in white paints is titanium dioxide.

■ **Binders/Resins** — base components that enable the product to adhere to the painted surface and form a film.

■ **Additives** — contribute specific qualities to the paint; additives may be used as antifreezes, fungicides and preservatives.

There are many different organic and inorganic substances found within these groups, some that are benign and others that are potentially harmful. Symptoms that people might experience from exposure to some of the chemicals in paint range from mild to severe



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and depend upon the substance and quantity involved, duration of exposure, quality of air circulation and individual sensitivity. Short-term impacts from breathing solvent vapors include sensitivity of the eyes, nose, throat and skin, dizziness and nausea. Many symptoms may subside after a short time, but repeated exposure may cause chronic bronchitis or permanent damage to the liver and kidney. Long-term exposure may also lead to developmental, neurological or respiratory impairment. These impacts are more likely to affect those working directly with the paint, but some harmful ingredients will continue to be released while the paint is drying. In addition, if the painting project takes place during business hours, those in the surrounding area are directly exposed to the chemicals as well. The metals and toxic substances prohibited from the recommended paints can be found in the list below.

PROHIBITED INGREDIENTS
HEAVY METALS
Antimony
Cadmium
Hexavalent chromium
Lead
Mercury
TOXIC ORGANIC SUBSTANCES
Acrolein
Acrylonitrile
Benzene
1,2-dichlorobenzene
Ethylbenzene
Butyl benzyl phthalate
Formaldehyde
Isophorone
Methylene chloride
Methyl ethyl ketone
Methyl isobutyl ketone
Naphthalene
Phthalate esters
1,1,1-trichloroethane
Toluene
Vinyl chloride

According to the National Paint and Coatings Association (NPCA), waterborne paints have become increasingly valued for their reduced environmental and health impacts. Demand in the marketplace has driven manufacturers to develop improved coatings technologies. The result is latex paints with low odor, easy clean-up, and quick drying times.

Solvents used in paints are often volatile organic compounds (VOCs), which are highly evaporative substances that are known to contribute to indoor and outdoor air pollution. Indoors, solvents are a cause of concern because they are breathed in by painters and by others inside the building as the paint is applied and as it dries. Outdoors, VOCs can react with sunlight and form ground-level ozone; a significant issue in urban areas already challenged by other sources of smog. There is also the potential for water contamination caused by improperly discarded paint, or from paint constituents leaching from landfills. Toluene (methyl benzene), a volatile organic compound that is used as a paint solvent, can affect the nervous system, kidneys, liver and heart. Naphthalene and methyl ethyl ketone, sometimes used as solvents, can damage the liver or gastrointestinal tract and may affect reproductive health. Phthalates, such as dibutyl phthalate, are sometimes added to give the paint adequate spreadability but are toxic when inhaled or ingested and can cause eye irritation or burn the skin on contact.

Heavy metals or their compounds may be used in paints as pigments, drying agents and biocides. For example, cadmium may be used to give color to the paints, and mercury compounds may be added as an element in a pigment or a fungicide to prevent mildew from forming after application. These heavy metals are neurotoxins and can damage the liver and kidney. Toxic organic substances that may cause harm to people working with or near paint include formaldehyde and toluene. Exposure to formaldehyde, a suspected carcinogen, can cause acute reactions such as irritation of the eyes, nose and throat.

Picking Paint

Depending upon the type of paint you select, you can improve the appearance of your building and also protect human and ecological health. Here are some guidelines to help you do just that:

Evaluate Your Needs

The first step is actually to determine whether it is necessary to paint the area. If the repainting job is specified as part of a periodic maintenance schedule,



make sure that the area is truly in need of paint before proceeding. It may be possible to postpone the project if the existing coating is intact and the area simply needs to be cleaned rather than repainted. If it is decided that the area needs to be painted, calculate the quantity of paint needed to cover the areas to be painted and purchase only the amount you will use for the project. Excess paint can become unusable if it is not stored properly or the color is not acceptable for subsequent painting needs.

Work with Water

Paint products are generally classified as either water-based (latex) or oil-based (alkyd), according to the type of carrier used. Latex paints are preferable to alkyd paints because they use a benign solvent, water, as a carrier. Alkyd paints, on the other hand, generally utilize very volatile solvents as carriers to impart adequate application and drying characteristics to the products. Furthermore, alkyd paints require additional harmful solvents for cleaning up after the job is complete. Technological advances have enabled latex paints meet or exceed the performance of oil-based paints. In fact, one manufacturer’s newsletter states that some alkyd paints, reformulated to comply with the U.S. Environmental Protection Agency’s lower VOC limits for architectural and industrial maintenance coatings, may take longer to dry and yellow quicker than the original versions. The manufacturer suggests switching to a latex paint to combat the latter problem.

Look for Low or No Volatile Organic Compounds (VOCs)

Presence of VOCs can often be detected by their strong odor, and they can irritate the eyes, nose, throat and skin. In general, low odor paints have lower VOCs than conventional paints, while quick-drying paints generally have higher VOCs, as it is the very characteristic of volatility that allows the liquid portion to evaporate leaving the solid paint film behind. Based on information provided by the manufacturers, all paints in the recommended list meet the maximum VOC levels allowed by the Green Seal standard (see table).

MAXIMUM ACCEPTABLE VOC LEVEL (g/L MINUS WATER)		
Paint Type	Interior	Exterior
Flat	50	100
Non-Flat	150	200

Choose Paints Without Heavy Metals or Toxic Ingredients

The label on the outside of the can may indicate the presence of harmful constituents inside. A low VOC level is not the only criterion to use in paint selection. According to the Green Seal standard for paints, there are various compounds used in paint that should be restricted from the paint



you select. These substances can be replaced by less harmful ingredients without a loss of desired attributes or quality. Specific ingredients may not appear on the label, but you could review the product’s material safety data sheets for the Green Seal-prohibited ingredients listed on page 3.

Purchase Only What You Need for the Job at Hand

Paints are often sold by the gallon and the quart, which allows for more precise purchasing. Most paints cover 400 square feet per gallon, depending upon the product and application method. So use these factors to determine how much paint you will need for the area being painted.

Work in a Well-Ventilated Area

Low VOC paints are particularly good for interior painting jobs, but adequate ventilation is always necessary. In fact, with low VOC products, work may be done during regular business hours without disrupting business operations or subjecting workers and visitors to noxious chemicals or odors. This is a selling point made by several manufacturers of low VOC paints.

Properly Store Leftover Paint

Even when you attempt to estimate your needs, there may be paint remaining. If there is enough paint for a smaller job or to save for future touch-ups, close the can tightly to prevent it from drying out. To indicate the color inside, write the location that the color was used or put a dot of paint on the lid of the can. In colder regions, another storage consideration is that latex paints may freeze below a certain temperature.

Continued on page 6

Recommended Interior Paints

PRODUCT (INTERIOR)	MANUFACTURER	VOC G/L
Safecoat Zero VOC Eggshell	American Formulating & Manufacturing	0
Safecoat Zero VOC Flat	American Formulating & Manufacturing	0
Safecoat Zero VOC Semi-Gloss	American Formulating & Manufacturing	0
Pristine Eco Spec Interior Latex Eggshell Enamel 223	Benjamin Moore	0
Pristine Eco Spec Interior Latex Flat 219	Benjamin Moore	0
Pristine Eco Spec Interior Latex Semi-Gloss Enamel 224	Benjamin Moore	0
Solvent-Free Wall Paint # 18	Bioshield	0
Odorless Solvent-Free Eggshell	Coronado Paints	0
Odorless Solvent-Free Flat	Coronado Paints	0
Wonder Pure Flat	Devoe	0
Genesis Odor-Free Latex Flat	Duron Paints	0
Genesis Odor-Free Latex Semi-Gloss Enamel	Duron Paints	0
Lifemaster 2000 Eggshell	ICI Dulux	0
Lifemaster 2000 Flat	ICI Dulux	0
Lifemaster 2000 Semi-Gloss	ICI Dulux	0
Ecological Flat 2000 GS	Innovative Formulations	0
Ecological Semi-Gloss 2000 GS	Innovative Formulations	0
Enviro-Cote 1500 Flat	Kelly-Moore	0
Enviro-Cote 1510 Satin	Kelly-Moore	0
Enviro-Cote 1520 Semi-Gloss	Kelly-Moore	0
Natural Odor-Free Flat Wall Paint	McCormick Paints	0
Natural Odor-Free Low Sheen Acrylic Latex Enamel	McCormick Paints	0
Health Spec Eg-shel Enamel	Sherwin-Williams	0
Health Spec Semi-Gloss Enamel	Sherwin-Williams	0
Enviro-Safe Flat	Chem-Safe Products	1
Enviro-Safe Satin	Chem-Safe Products	1
Enviro-Safe Semi-Gloss	Chem-Safe Products	1
Wonder Pure Eggshell	Devoe	3
Wonder Pure Semi-Gloss	Devoe	3
Air Care Latex Semi-Gloss	Coronado Paints	4
HealthSpec Flat Enamel	Sherwin-Williams	6
Parade Flat White	United Coatings	12
Pittsburgh Paints Solvent-Free Interior Semi-Gloss	PPG Architectural Finishes	14
Coverall Flat White	United Coatings	14
Builders Masterpiece Interior Latex Flat	Duron Paints	15
Pittsburgh Paints Solvent-Free Interior Flat	PPG Architectural Finishes	16

VOC volatile organic compounds measured in grams per litre minus water.

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Recommended Interior Paints (cont.)

PRODUCT (INTERIOR)	MANUFACTURER	VOC G/L
Pittsburgh Paints Solvent-Free Eggshell	PPG Architectural Finishes	24
Speedcraft Commercial Interior Flat	PPG Architectural Finishes	31
Washable Wallplate Odor-Free Flat Enamel White	Bruning Paint	38
Supar Kote 1000 Latex Flat	Coronado Paints	41
Aladintone Satin	United Coatings	41
Speedhide Interior Latex Flat	PPG Architectural Finishes	43
Washable Wallplate Odor-Free Flat Enamel Neutral Base	Bruning Paint	44
Interior Latex Low VOC Flat	Muralo	46
P.C. Eggshell	United Coatings	46
Pittsburgh Paints Manor Hall Interior	PPG Architectural Finishes	49
Bruning Odor-Free Ceiling Flat White	Bruning Paint	50
Speedpro Semi-Gloss	PPG Architectural Finishes	51
Washable Wallplate Interior Odor-Free Latex Eggshell Enamel	Bruning Paint	73
Wallhide Interior Eggshell	PPG Architectural Finishes	74
Speedhide Interior Eggshell	PPG Architectural Finishes	88
Interior Latex Low VOC Eggshell	Muralo	89
Pittsburgh Paints Manor Hall Interior Latex Semi-Gloss	PPG Architectural Finishes	93
Satinhide Interior Semi-Gloss	PPG Architectural Finishes	93
PROMAR 400 Latex Interior Finish Semi-Gloss	Sherwin-Williams	96
New Wave Odor-Free Satin	Finnaren & Haley	100
Classic 99 Semi-Gloss	Sherwin-Williams	105
Speedhide Interior Semi-Gloss	PPG Architectural Finishes	106
Ultra Delux Interior Vinyl Acrylic Semi-Gloss Enamel	Duron Paints	116
Pittsburgh Paints Manor Hall Interior Eggshell	PPG Architectural Finishes	117
PROMAR 400 Latex Interior Finish Eg-shel	Sherwin-Williams	120
Plastic Kote Acrylic Eggshell Enamel	Duron Paints	131
Super Kote 3000 Vinyl Acrylic Semi-Gloss	Coronado Paints	135
Washable Wallplate Interior Odor-Free Latex Semi-Gloss Enamel	Bruning Paint	136
Pro Kote Supreme Latex Semi-Gloss	Duron Paints	138
Classic 99 Satin	Sherwin-Williams	144
PROMAR 200 Latex Interior Finish Eg-shel	Sherwin-Williams	144

VOC volatile organic compounds measured in grams per litre minus water.

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Remains of the Day

Ideally, once the job is complete, there will be little leftover paint. If

you can't find alternative uses for it within your company, look for others who may need it, such as schools, day-care centers or non-profit organizations. If there is a

sufficient amount of usable paint (1/3 can is generally acceptable) it may be worth looking for paint exchanges or recycling programs that may exist in your area. These

Recommended Exterior Paints

PRODUCT (EXTERIOR)	MANUFACTURER	VOC G/L
Decra-Shield Flat	ICI Dulux	0
Decra-Shield Satin	ICI Dulux	0
Ecological Flat 2000 GS	Innovative Formulations	0
Enviro-Safe Satin	Chem-Safe Products	1
Aquacrylic Flat	United Coatings	5
Acryclad Gloss	United Coatings	68
Acryclad	United Coatings	80
Century 2000	United Coatings	83
Sun-Proof Exterior Latex Semi-Gloss	PPG Architectural Finishes	84
Sun-Proof Exterior Flat Latex	PPG Architectural Finishes	90
Ultra Delux Exterior Latex Flat	Duron	91
65 Series Vinyl Acrylic Flat	Kelly-Moore	97
62 Series 100% Acrylic Flat	Kelly-Moore	100
A-100 Latex Finish Satin	Sherwin-Williams	108
LOWTEMP 35 Exterior Latex Satin	Sherwin-Williams	108
Super Paint Exterior House & Trim Satin	Sherwin-Williams	108
Weathershield Exterior 100% Acrylic Semi-Gloss House Paint	Duron	116
Sun-Proof Exterior Latex Satin	PPG Architectural Finishes	123
1245 AcryVelvet Eggshell	Kelly-Moore	124
Speedhide Exterior Semi-Gloss	PPG Architectural Finishes	125
Speedhide Exterior Satin	PPG Architectural Finishes	128
Storm Plate 30 Low Lustre	Finnaren & Haley	132
Super Paint Exterior House & Trim High-Gloss	Sherwin-Williams	132
Weathershield Exterior 100% Acrylic Latex Satin	Duron	139
A-100 Latex Finish Gloss	Sherwin-Williams	156
Super Paint Exterior House & Trim Gloss	Sherwin-Williams	156
Ultra Delux Exterior Latex Semi-Gloss	Duron	158
Pittsburgh Paints Manor Hall Exterior Semi-Gloss	PPG Architectural Finishes	178
Semi-Gloss House & Trim	Finnaren & Haley	190

VOC volatile organic compounds measured in grams per litre minus water.

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offer a formal way to donate, reuse or recycle usable paints.

Recycled-Content Paint

There are two types of recycled-content paint available in the marketplace, rebledned (also

known as consolidated) and reprocessed. Both originate from post-consumer latex paint collected through public and private paint programs. As the volume of leftover paint collected by public and private sectors

increases, more government programs and paint manufacturers are becoming involved in paint recycling. Also, Federal procurement guidelines under the Resource Conservation and Recovery Act require the purchase of recycled-

content latex paint where possible, which may provide impetus for increased entry into this market.

Over 15 states have paint rebrending programs, which are often initiated by environment or waste management departments. Paint collected in these programs is combined and sold, often at lower prices than non-recycled paints. Some of these programs collaborate with paint manufacturers to process and package paint whereby the collected paint is re-mixed, screened and packaged for distribution. Reblended paint contains 100 percent post consumer content with no virgin materials such as resins and colorants added, and paints are not tested to specifications. Originally available only in beige or brown, improved matching systems for reblended paints can produce colors outside this spectrum. But even a limited color palette offers shades that are suitable for areas where bright colors are not desired. Reblended paints are well-suited to use in low-traffic areas, where color is

not important, and can be used as a base coat or to cover graffiti.

A number of paint manufacturers have ventured into paint reprocessing, whereby reblended paint is mixed with virgin raw materials such as resins and colorants. The final product contains anywhere from 20 - 100 percent recycled content and performs comparably to non-recycled paint. Reprocessed paint is generally tested to assure that products will meet performance characteristics before it is packaged for sale, but identification of specific ingredients and measurement of VOC levels is still the exception rather than the rule.

At this time, some obstacles to the widespread acceptance of paints with reclaimed materials exist. Beyond the fairly limited color range, concerns include feedstock quality, consistency of product between batches, VOC levels and chemical constituents of recycled paints. Stringent sorting protocols and testing are needed to eliminate toxic chemicals and

Although Green Seal is unable to recommend specific brands or manufacturers of recycled-content paints due to lack of technical data available, sources for these can be obtained from the Minnesota Office of Environmental Assistance at 651.215.0210 or on the EPA's procurement website at www.epa.gov/epaoswer/non-hw/procure/products/paint.htm.

impurities. While reprocessing facilities generally perform some testing, this may be difficult particularly for municipal programs due to technical or financial constraints. Thus, recycling paint can contribute to achieving pollution prevention and waste reduction goals, yet using recycled paint may be a challenge if other environmental criteria are a concern. To address these issues, state governments such as Minnesota's are working with industry to develop paint specifications and state contracts that include environmental criteria for recycled paint.

The performance of recycled-content paints, as well as the cost savings possible from using them, have been documented in several states, most notably Minnesota and Washington. These paints have been used in maintenance facilities, municipal buildings, offices and conference areas with positive results. As virgin paint increasingly is made in a less environmentally harmful manner, the recycled-content paint that is subsequently made from it will likely improve as a result. Furthermore, continued technology improvements and success with trade products may prove to a broader audience that



recycled paints are viable for many uses, much like the evolution in acceptance of recycled-content paper.

Minimize Disposal Impacts

When the paint or container must be discarded, be sure it is done properly. If there is not enough paint to save for future use, it can be handled in a few ways. Never pour paint down the drain. Check with local regulations on paint disposal. The National Paint and Coatings Association recommends that latex paint be poured into a paper bag to dry out and disposed of in regular trash, and the steel can may then be recycled. Alkyd (oil-based) paints must be disposed of as hazardous waste if still in liquid form, but can be disposed of with other trash if completely dried.

A Note on Naturals

Various paint components, from pigments to resins, are being derived from renewable resources as alternatives to components of conventional architectural paints that are primarily made with synthetic materials or finite resources. For example, casein, or milk protein, is used as a binder in a few paints on the market. This meets the criteria for containing environmentally preferable raw materials, but renders the painted surface susceptible to mildew.

MANUFACTURER CONTACT INFORMATION		
COMPANY	TEL	INTERNET
American Formulating & Manufacturing	619.239.0321	www.afmsafecoat.com
Benjamin Moore	800.826.2623	www.benjaminmoore.com
Bioshield	800.621.2591	www.bioshieldpaints.com
Bruning Paint	800.852.3636	
Chem-Safe Products	210.657.5321	
Coronado Paints	904.428.6461	
Duron Paints	800.72DURON	www.duron.com
Finnaren & Haley	610.825.1900	www.fhpaint.com
ICI Dulux	800.984.5444	www.iciduluxpaints.com
Devoe	888.681.6353	www.devoepaint.com
Innovative Formulations	520.628.1553	www.mirrorseal.com
Kelly-Moore	888.677.2468	www.kellymoore.com
McCormick Paints	877.PAINT55	www.mccormickpaints.com
Muralo	800.631.3440	
Pittsburgh Paints/PPG Architectural Finishes	888.PPG.SPEC	www.ppgaf.com
Sherwin-Williams	800.524.5979	www.sherwin-williams.com
United Coatings	800.541.4383	

Thus, casein paints may be useful for some indoor uses, but should not be used on building exteriors, in highly humid regions or in areas where the finished surface will be exposed to considerable moisture (e.g., a bathroom) or require frequent cleaning.

Plant based solvents, such as d-Limonene from citrus rinds and d-Pinene from trees, have an advantage over petroleum-based ones in that they avoid utilizing a finite resource. However, some of these alternatives have VOC levels on par with petroleum based solvents. Natural solvents also have the potential to burn the eyes and skin or cause other adverse reactions like conventional solvents.

Also, these products may not be readily available or may not meet certain performance characteristics. The paints may require additional care in surface preparation, application and maintenance to achieve desired results. However, because they have other environmentally valuable attributes, they may be worth consideration for certain uses. For instance, where full coverage is not crucial, or a more hand finished look is acceptable, a paint with lower hideability may not pose a problem. When investigating alternative paints, determine your performance needs and then evaluate the options carefully. This will ensure that in selecting these paints for their environmental attributes, they will meet performance criteria as well.



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IN THIS ISSUE

- **Recommended Interior and Exterior Paints**
- *Selection*
- *Use*
- *Handling*

PREVENTING PAINT POLLUTION PAYS

OFF FOR ABERDEEN PROVING GROUND

Aberdeen Proving Ground (APG), a US Army post in Maryland took a systems approach to reducing paint pollution. It included adopting a standard, testing and listing paints, implementing a paint purchasing policy, developing reuse opportunities for excess paint, reducing improper disposal, installing compliance measures and publicizing the program and its benefits.

Green Seal reviewed all 2,200 paints in use at APG against an environmental standard that included maximum VOC limits and prohibited harmful ingredients. This resulted in the elimination of duplicate or discontinued products as well those paints that did not meet the standard. The remaining 107 paints were submitted for VOC testing, and the 71 paints that passed (13%) gave APG a selection of interior and exterior paints in a variety of finishes from 13 manufacturers.

Painting contracts and purchase orders require that all paint meet APG's standard. Local paint stores were asked to cooperate in the program in exchange for encouraging just-in-time purchasing from them.

Waste paint can be brought to the post's self-help facility where it is distributed free for unit and quarters touch-up. Unused paint is contributed to a local charity which gives it to the disadvantaged. This lessens improper disposal, reduces the cost and paperwork of disposing of paint as a hazardous waste and eliminates stockpiling.

Recommended paints in this study cost an average of \$1.76 less per gallon than others. When decreased disposal costs and reduced purchases are added, total savings are estimated to be \$50,000 a year.

The Aberdeen Paint Program demonstrates how environmentally responsible purchasing can reduce impacts on the environment, make a positive contribution to the neighborhood and save money as well.



GREEN

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PAPER TOWELS

Every time you use a paper towel, you are using an item that is gone forever, unable to be recycled. Used in over 90% of American households, consumers discard over 3,000 tons of paper towels every day. Most of us never think about where this wastepaper will end up or the environmental concerns associated with its creation and ultimate disposal.

American consumers discard over 3,000 tons of paper towels every day.

With every sheet of paper towel used, there is the potential to save paper (and ultimately trees), water and energy and to decrease or eliminate the release of certain toxins. This *Choose Green Report* discusses the environmental concerns associated with these towel products including recycled content, bleaching, deinking and packaging. In the report's table we compare brands of paper towel products, providing information on recycled content, the bleaching process, packaging and other important information.



Recycled Products

Paper towels (along with napkins) account for approximately 50% of all tissue production. Consumption totals 2.5 million tons or more annually. These types of papers cannot be recycled after they are used. Therefore, they present the best final use of fiber that has already been used in other products. Virgin materials are best left for

products that can be recycled. Many towel products do incorporate wastepaper into their product line, albeit they are not often labelled as a recycled content product. Although the total recycled content is much higher than other paper products (average of 40-50%), the ability to incorporate a higher percentage of

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Recycled Products
continued from page 1

recycled material has been accomplished by several manufacturers and is preferred from an environmental standpoint. If, for example, all paper towels utilized 100% recycled materials, approximately 1 million tons of used paper would be kept from being dumped into our waste stream. The use of recycled paper products can have other environmental benefits as well.

For every ton of paper that is recycled, 3.3 cubic yards of landfill space are saved. It takes 3.5 tons of wood to produce one ton of tissue paper. Replacing that wood with

Paper towels cannot be recycled after they are used. Therefore, they present the best final use of fiber that has already been used in other products.

wastepaper would therefore save trees. Manufacturing paper products from virgin fiber (versus recycled) consumes twice as much energy and more water, wood, and other natural resources. There is often a higher amount of discharge of most air and water pollutants, too. For every ton of 100% recycled paper manufactured, approximately 4,100 kwh of energy and 7000 gallons of water would be saved. Sixty pounds of air pollutants would be kept from our atmosphere as well.

It should be noted that total recycled content refers to both preconsumer and postconsumer materials.

■ **Postconsumer** refers to end products that have been generated by the consumer. These materials have been separated from the waste stream instead of being landfilled or incinerated.

■ **Preconsumer** refers to materials that are captured by the manufacturers prior to consumer use. They include pulp substitutes and mill scraps.

Although both are important, Green Seal recommends choosing products with the highest postconsumer content. Increasing the amount of postconsumer fiber in paper towels offers the greatest opportunity to divert wastepaper from the waste stream. This will encourage companies to increase the amount of recycled materials in their products and will benefit recycling programs as well. Therefore, Green Seal recommends choosing paper towels with a

minimum of 40% **postconsumer** paper material.

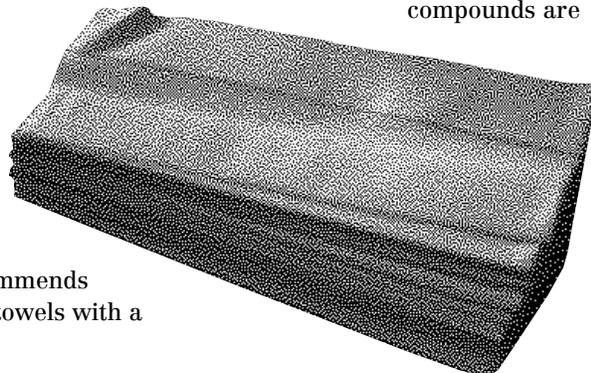
Bleaching

Often manufacturers will bleach the paper fibers that will be used in the paper towels. This process is done to remove the remaining lignin (the “glue” that holds the wood fibers together) in the pulp and to increase the brightness of a product, whitening the unbleached, brownish pulp as well. Bleaching has been traditionally carried out with elemental chlorine. Using elemental chlorine results in the release of chlorinated compounds, especially dioxins. Chlorinated organic compounds, including

dioxins and furans, are confirmed carcinogens and mutagens and have been known to affect the immune and reproductive systems. They are harmful to humans, aquatic life and wildlife. They are also known to be bioaccumulative.

This refers to the buildup of higher and higher concentrations of potentially toxic chemicals in organisms. The compounds are

Manufacturing paper products from virgin fiber consumes twice as much energy and more water, wood, and other natural resources.



The **Choose Green Report** is published for Green Seal Environmental Partners. To become an Environmental Partner, or to receive a copy of this report, contact Green Seal at (202) 588-8400 x 21 or lcarr@greenseal.org.

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Green Seal recommends choosing paper products that are unbleached whenever possible. The next choice would be:

■ **Process Chlorine Free (PCF)** paper products. This is a term reserved for recycled content products. All recycled fibers must not be bleached with chlorine or its derivatives. The recycled paper may have been bleached with chlorine or its derivatives in its original (pre-recycled) processing. If the product contains any virgin component, these fibers must also be totally chlorine free.

■ **Elemental Chlorine Free (ECF)** products are the next choice. These are products that have been bleached with a chlorine derivative. Although they are not nearly as preferable as PCF or unbleached products, they are preferred over chlorine bleached products because fewer chlorinated organic compounds are released.

■ **Totally Chlorine Free (TCF)** is also a term you may come across. This refers to a product made totally from virgin components (and therefore not recommended for a towel product). The product is bleached with an alternative to chlorine or its derivatives. This would include hydrogen peroxide or ozone. With TCF bleaching no chlorinated organic compounds are released.

ingested or absorbed but cannot be broken down. Organisms at the top of food chains may therefore accumulate as much as a millionfold higher concentrations than those present in the environment. It has been reported that over 1 trillion gallons of wastewater contaminated with chlorinated organic compounds are released by the paper and pulp industry every year.

Derivatives of chlorine such as chlorine dioxide are also being used to accomplish the bleaching process. Although these derivatives emit fewer dioxins, furans and other chlorinated organic compounds, these harmful compounds are still released.

Alternatives to chlorine and its derivatives for bleaching include oxygen, hydrogen peroxide, enzyme bleaching and ozone. Use

of these compounds does not result in the release of dioxins. Keep in mind as well, that paper towels and other tissue products do not need to be bleached at all! Brown paper towels can work just as well as those that are bleached.

Deinking

The process of deinking involves the removal of coatings, fillers, pigments, inks and dyes from the reusable cellulose fiber of paper before it is used in the manufacturing of recycled content paper towels and tissue products. Deinking allows the use of the most substantial portion of the paper (the cellulose fiber) to be extracted for recycling.

One major concern of deinking lies with the residual sludge that is created after the deinking process is complete. This sludge can

contain toxic heavy metals such as cadmium, chromium, mercury, arsenic and many others. These metals are contained in the inks and dyes used in printing. The sludge may also contain contaminants from the original paper bleaching process such as chlorinated organic compounds. The deinked pulp as well is often re-bleached with chlorinated compounds.

This sludge is disposed of in several ways. It can be placed in a special landfill which has been designed with leachate and groundwater monitoring systems. The sludge can also be incinerated, "landfarmed" (distributed over farmland soils) or reused (in the manufacturing of concrete blocks for example). None of these options are without possible impact, but creating products with a recycled content are preferable to those made with virgin materials. This is because the impacts of deinking tend to be less severe than those associated with the use of virgin pulp. The use of deinking mills diverts a large amount of refuse from entering our municipal waste stream. Although sludge is produced, a deinking mill produces 21-31% less effluent per unit of production as compared to a virgin paper mill. Deinked sludge also contains significantly less chlorinated organic compounds than the

If deinked stock is used, it is imperative that the toxic materials used in inks and dyes be eliminated and that chlorine not be used for paper bleaching.

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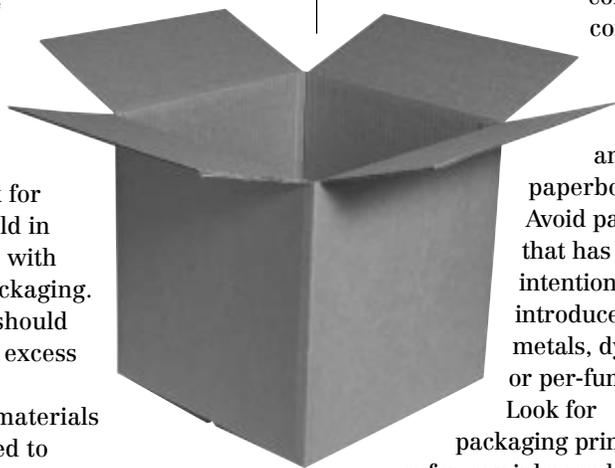
Deinking
continued from page 4

original bleaching of the wastepaper stock. If the deinked stock is re-bleached, less bleach is required. As little as 10% of the bleaching compounds used in virgin paper production is used to bleach the deinked stock.

If deinked stock is used, it is imperative that the toxic materials used in inks and dyes be eliminated and that chlorine not be used for paper bleaching. By decreasing and eliminating these harmful chemicals the deinking process can become a safer process and the environment will reap the benefits.

A Word On Packaging And Source Reduction

When purchasing your tissue products you should always consider the impacts of the packaging. Remember, a large amount of packaging ends up in the solid waste stream. We must also be concerned with the way the packaging is manufactured. Packaging can contain toxic metals and chemicals and can incorporate non-renewable resources, as well. Therefore, always look for products sold in bulk and/or with minimal packaging. Packaging should not contain excess and useless packaging materials that are used to make the product appear "bulked-up". Check to make sure



BE ON THE LOOKOUT . . .

For "private label", recycled paper towel products. Most major chains that carry paper towels on a regular basis have a "private label". Read the labels carefully to find paper towels with a minimum of 40% postconsumer recycled content. Seek out, natural (brown) unbleached towels too. The bleaching process may not be indicated on the label, but a consumer information number is often provided for you to find the answers to such questions. And best of all . . . these products are often cheaper than major brand competitors!



products do not contain surplus packaging either. Products that are

Look for products sold in bulk and/or with minimal packaging.

Check for packaging that is recycled and is recyclable.

breakable, spillable, or toxic and harmful may require extra packaging, but paper towels do not. Look for packaging that is recycled and is recyclable. For example, look for a

content in corrugated cardboard boxes and

paperboard. Avoid packaging that has intentionally introduced toxic metals, dyes, inks, or per-fumes.

Look for packaging printed with safer, soy inks made from renewable resources.

Also when choosing a paper towel product, use a hard roll towel whenever possible. These are towels that are wrapped around a central core and allow the user to take only as much as is needed, as opposed to the pre-set amount of pre-folded towels. If using a hard roll in a bathroom dispenser, reduce the amount of paper towel that is dispensed to the user. Hard roll towels and some jumbo products can also use less packaging per weight than folded towels. Using less product works out to mean using less fiber, which means you reduce the overall impact of paper towels. Less fiber means fewer air, water and solid pollutants are created and fewer non-renewable fossil fuels are depleted.

Finally, when buying hard roll towels look for those that offer more cubic feet than other standard rolls. Be sure to read labels carefully. Some manufacturers may "puff up" their products with air so that they look the same in diameter, but offer fewer sheets per roll. More sheets per roll helps to reduce both packaging waste and the amount of fuel used for transport.

To Wipe Or Not To Wipe? With A Cloth

Most would assume that using a reusable, washable cloth towel would be the easy solution to the paper towel dilemma. Yet this is not always the case. Cloth towels themselves do not come without their own environmental concerns. One must consider the energy, water, fertilizer, insecticide and herbicide costs associated with the growing of the cotton and the manufacturing of the cloth, as well as, the potential for soil erosion. Energy and water concerns and pollutants are also associated with the washing and drying of the cloth. In certain instances, cloth towels could also spread bacteria or disease.

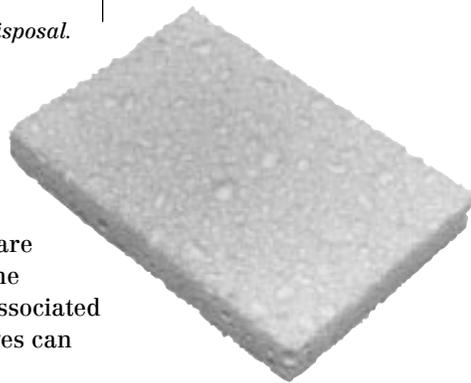
Sponges are another replacement for paper towels. They have

the advantage of being used several times and not requiring the use of a washer or dryer. They also require only 20% of the production required to manufacture recycled paper towels. Sponges however are often made from the cellulose by-products of the virgin paper making process. This means they are subject to many of the same environmental concerns associated with paper making. Sponges can

Cloth towels and sponges have their own environmental advantages and disadvantages . . . how they are manufactured or harvested, sanitization, and disposal.

also be made from non-renewable petroleum products. If you choose a natural sponge, there is the potential for damage to underwater reefs during collection.

So what do you do? Green Seal recommends that if the cloth or sponge is to be used only once (as in restaurants and certain institutional settings) it is probably best to use a paper towel instead.



GREEN SEAL RECOMMENDS CHOOSING PAPER TOWELS THAT . . .

- Contain the maximum amount of postconsumer fiber.** The minimum amount you should choose is 40%.
- Are unbleached whenever possible.** If you insist on a white paper towel, choose those that are Process Chlorine Free (PCF) first. If PCF towels are not available, choose a product that is Elemental Chlorine Free (ECF).
- Are packaged responsibly.** Look for minimal packaging and/or products sold in bulk. Choose products that are packaged in materials that are recycled and recyclable, and are free of toxic metals, fragrances, dyes and inks made from non-renewable resources.
- Are hard roll and are considered jumbo products.**

Recommended Paper Towels

BRAND/MANUFACTURER	RECYCLED CONTENT	BLEACHING PROCESS	PACKAGING	COMMENTS
 HARMONY/ SEVENTH-GENERATION 800-456-1191 (wholesale) 800-456-1177 (retail catalogue)	100% recycled 100% postconsumer	Natural- unbleached	<ul style="list-style-type: none"> • Minimal, recyclable • More sheets per roll than other brands • Compress 2-3 regular rolls into one without using more space 	<ul style="list-style-type: none"> • HRT • Towels are free from intentionally introduced dyes, inks & fragrances • Available in small & large numbers • Wholesale, retail catalogue, general retail
 SECOND NATURE PLUS/ Wisconsin Tissue 800-451-3595	100% recycled 100% postconsumer	Natural- unbleached	<ul style="list-style-type: none"> • Product #1975 offers 2X the amount of full-sized sheets as compared to their standard roll 	<ul style="list-style-type: none"> • HRT, CFT, MFT • Available in small & large numbers • Distributors
 OVATION/Encore Paper Company, Inc. 800-ENCORE-5	100% recycled Brown towels: 80% postconsumer, 20% preconsumer	Brown- unbleached	<ul style="list-style-type: none"> • Paper wrap, poly film, chipboard sleeves & corrugated cartons contain recycled material & are recyclable • Inks used on packaging do not contain heavy metals or fragrances 	<ul style="list-style-type: none"> • HRT, CFT, MFT • Distributors
 ENVISION: Preference and Acclaim/Fort James Corp. 203-854-2793	100% recycled Preference-65-95% postconsumer, 5-35% preconsumer Acclaim-90-95% postconsumer, 5-10% preconsumer	Natural- unbleached	<ul style="list-style-type: none"> • Minimal • Corrugated boxes are recycled & recyclable • Film is recycled within facility for energy 	<ul style="list-style-type: none"> • HRT, CFT, MFT • Towels are free from intentionally introduced dyes & fragrances • Available in bulk • Wholesale & brokers
 RENAISSANCE/ Fort James Corp. 203-854-2793	40% postconsumer	Brown- unbleached	<ul style="list-style-type: none"> • Minimal • Corrugated boxes are recycled and recyclable • Film is recycled within facility for energy 	<ul style="list-style-type: none"> • HRT, CFT, MFT, SFT
 HARMONY/ SEVENTH-GENERATION 800-456-1191 (wholesale) 800-456-1177 (retail catalogue)	100% recycled 100% postconsumer	White-PCF	<ul style="list-style-type: none"> • Minimal, recyclable • More sheets per roll than other brands • Compress 2-3 regular rolls into one without using more space 	<ul style="list-style-type: none"> • HRT • Towels are free from intentionally introduced dyes, inks & fragrances • Available in small & large numbers • Wholesale, retail catalogue, general retail

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Recommended Paper Towels

BRAND/MANUFACTURER	RECYCLED CONTENT	BLEACHING PROCESS	PACKAGING	COMMENTS
★ MARCAL ^{1,2,3} SUNRISE ^{1,2} and private label kitchen roll towels 1/ Marcal Paper Mills, Inc. 201-703-6373 (AFHP) 201-703-6393 (AHP) (trade buyers) 800-548-7337 (general consumer)	100% recycled Min. 60% postconsumer	PCF	<ul style="list-style-type: none"> • Minimal • Bulk (multi roll packs) & maxi-roll products available • 15 roll towel products use a polycase™ system which saves space, weight, & fuel. The film is recycled by chainstore operators. 	<ul style="list-style-type: none"> • HRT • Distributors, U.S. Military's commissary system and some retail chains • Marcal is recycling with approximately 1000 communities which market their postconsumer paper fiber to Marcal.
SCOTT, SURPASS, KLEENEX SCOTTFOLD, KLEENEX and TRADITION/Kimberly-Clark: 800-241-2739 (industrial) 800-553-3639 (consumer products)	Min. 40% postconsumer	ECF or PCF	<ul style="list-style-type: none"> • Folding cartons & chipboard sleeves are 100% recycled. • KDF's are 33% recycled. 	<ul style="list-style-type: none"> • HRT, CFT, MFT • KLEENEX SCOTTFOLD is a folded towel • Distributors
ENVISION: Preference Ultra, Preference and Acclaim/ Fort James Corp. 203-854-2793	100% recycled Preference Ultra- 65% postconsumer, 35% preconsumer Preference- 65-95% postconsumer, 5-35% preconsumer Acclaim- 90-95% postconsumer, 5-10% preconsumer	White-ECF	<ul style="list-style-type: none"> • Minimal • Corrugated boxes are recycled & recyclable • Film is incinerated within facility for energy 	<ul style="list-style-type: none"> • HRT, CFT, MFT • Towels are free from dyes & fragrances • Available in bulk • Wholesale & brokers
PUTNEY PAPER TOWELS/ Putney Paper Co. 800-343-4026	100% recycled 40% postconsumer 60% preconsumer	ECF	<ul style="list-style-type: none"> • Packaging is 100% recycled: 40% postconsumer, 60% pre-consumer 	<ul style="list-style-type: none"> • HRT, CFT, MFT, SFT • Wholesale

NOTES:

✓ = A Green Buy. These are towels that meet or exceed the minimum levels of postconsumer recycled content recommended by Green Seal **and** are unbleached.

★ = A Honorable Mention. These are towels that meet or exceed the minimum levels of postconsumer recycled content recommended by Green Seal and are PCF.

HRT = Hard Roll Towel

CFT = C-Fold Towel

MFT = Multi-Fold Towel

SFT = Single-Fold Towel

PCF = Process Chlorine Free. Towels are NOT bleached with elemental chlorine or its derivatives.

ECF = Elemental Chlorine Free. Towels are bleached with a derivative of chlorine.

KDF = Knock Down Flat. This is the outer shipping box.

¹ Information on these Marcal products is based upon the assumption that the products were produced at Marcal's Elmwood facility.

² This is considered an "Away-From-Home Product" (AFHP)

³ This is considered an "At Home Product". (AHP)



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IN THIS ISSUE

- *Recycled Content*
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- *Deinking*
- *Packaging and Source Reduction*
- ***Recommended Paper Towels***

Look for these topics in our next issue on General Purpose Cleaners . . .

- **What to look for in a Green Cleaner**
- **Do's and Don'ts for Cleaners**
- **Recommended Products**



PARTICLEBOARD AND MEDIUM-DENSITY FIBERBOARD

Since U.S. production of particleboard began after World War II, this practical and inexpensive alternative to solid wood has become one of the nation's leading building materials. The floor you walk on, your workstation at the office, your household cabinets, and the walls and doors of your home may well contain particleboard (PB) or medium-density fiberboard (MDF), a similar product whose manufacture began in the United States in the mid-1960s.

Production and use of PB and MDF have grown dramatically in the past decade, replacing more and more solid wood lumber and plywood products. In fact, the combined production of PB and MDF in North America during 1999 was approximately 10.7 million cubic meters (over 12 billion square feet of 3/8-inch thick panel).

Though easy to produce and well-suited for a host of uses, most PB and MDF, as currently manufactured, use formaldehyde-based resins, which emit formaldehyde gas from factories, into the workplace, and into the home. Formaldehyde is considered a probable human carcinogen, and inhalation of even small amounts of the gas can increase risks of cancer. Some manufacturers are now turning to more benign resins to bind the wood products.

Meanwhile, though PB and MDF are currently manufactured primarily from wood residues from production of lumber and plywood, there is the opportunity to utilize post-consumer waste wood and



The amount of agricultural waste fiber far exceeds present and future fiber requirements for production of PB and MDF.

waste paper and agricultural residues as raw materials. Use of these materials can divert wastes from landfilling or burning. These alternative materials include straw residue, which is the stem of a grain crop, such as rice or wheat, and

bagasse, the residue from sugar cane processing. The amount of agricultural waste fiber far exceeds present and future fiber requirements for production of PB and MDF. Most residual straw and bagasse is now burned, which contributes to air pollution and global warming.

From an environmental standpoint it is also important to

make sure that the recycled content of wood-fiber-based PB and MDF is as high as possible and that little, if any, virgin wood is used. Recycled content saves trees.

This report evaluates various methods of producing PB and MDF and the associated environmental and health impacts. It also makes recommendations that will inform consumers and guide them to environmentally preferable—and safer—PB and MDF products.

PB and MDF: Hard-Pressed and Bonded for Life

Particleboard (PB) is a panel product made of sawdust and wood shavings bonded together by urea formaldehyde or other synthetic resin and pressed into sheets. Used primarily as core material for doors, furniture, and cabinets, particleboard often is covered on one or both sides with

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WHAT'S WHAT: SOME KEY DEFINITIONS

Post-consumer Materials: Materials or finished products that have served their intended use, been diverted or recovered from waste destined for disposal, and formed into useful consumer items. Post-consumer materials are part of the broader category of *recovered materials*.

Pre-consumer Materials: Materials generated by manufacturing and converting processes, such as manufacturing scrap and trimmings/cuttings. Also called post-industrial materials.

Recovered Materials: Waste materials and byproducts that have been recovered or diverted from solid-waste streams; this category does not include materials and byproducts generated from, and commonly reused within, an original manufacturing process.

Resin: The chemical material that binds the fibers together to produce particleboard or medium density fiberboard. Also called "binder."

vener or another surface finish. In housing construction, particleboard is used under carpet or other finished surfaces as floor underlayment and stair treads; it is also used as floor decking in mobile homes.

Medium-density fiberboard (MDF), a composite board made of wood fibers bonded with urea formaldehyde or other synthetic resin, has a smooth surface and good machinability. MDF is used as a replacement for wood boards in furniture, cabinets, moldings, and picture frames. Like PB, the wood residues used to manufacture MDF come from sawdust and shavings from lumber and plywood manufacturing processes.



The manufacture of PB in the United States began on a large scale after World War II as a low-cost replacement for lumber and plywood in furniture and cabinetry. Some twenty years later, in 1966, the first North American MDF plant began production in New York. Demand for PB and MDF has grown dramatically in the past decade, replacing more and more solid wood lumber and plywood products.

While demand for PB and MDF is increasing, there are concerns that the availability of wood residues is not keeping pace with this demand and that the price is increasing. This has led some producers to look toward alternative sources of fiber, such as agricultural waste products and wood and paper waste. Aside from any economic advantage, these alternatives also present environmental benefits such as diversion of waste from landfills or burning.

If These Walls Could Talk

Environmental Impacts of PB and MDF

A portion of the trees cut for lumber and plywood production become sawdust and trimmings that are used in PB and MDF. If trees are harvested for direct use in these products, then the impacts from growing and harvesting these trees must be considered as part of the environmental profile of PB and MDF. Information obtained from industry sources shows that approximately 25% of the production capacity in the U.S. and Canada uses some virgin wood in their products, ranging from 1 to 80% virgin content, averaging 34%.

The wood residues are either ground into particles (for PB) or steam heated to break down the residues into fibers (for MDF), then dried to lower moisture content. Many dryers are directly heated by combustion of a portion of the wood residues; others are heated by burning oil or natural gas. Dryers release wood dust, carbon monoxide, carbon dioxide, nitrogen oxides, fly ash, volatile organic compounds—such as terpenes, resin, and fatty acids—that evaporate from the wood, and combustion and pyrolysis products, such as methanol, acetic acid, ethanol, formaldehyde, and furfural.

After the fiber is dried, it is blended with wax, a synthetic resin such as urea formaldehyde, and other additives and formed into mats. The mats are processed in large presses that use heat and pressure to cure the resin and form the product into sheets or boards. Presses are usually heated by steam, which is generated by a boiler that burns wood residues.

The type of resin used to bind the wood fibers determines the type of air emissions released during the pressing process; typically these emissions include formaldehyde compounds, such as urea formaldehyde. Primary finishing steps for PB and MDF include cooling or hot stacking, grading, trimming/cutting, and sanding. Secondary finishing steps include filling, painting, laminating, and edge finishing.

When used in the home in furniture, subflooring, or stair treads, PB and MDF made with formaldehyde-based resins

Because no threshold has been determined below which exposures do not increase the risk of cancer, formaldehyde remains a health concern even at lower levels.

continue to release small amounts of formaldehyde gas. Producers have generally met industry standards and have reduced formaldehyde emissions from PB an average of 80 percent below 1980 levels, primarily by reducing the ratio of formaldehyde to urea in resin formulations.

reducing the ratio of formaldehyde to urea in resin formulations.

FORMALDEHYDE TOXICITY

According to the EPA, formaldehyde is a probable human carcinogen when inhaled or ingested. In fact:

- Breathing even small amounts of formaldehyde may increase the risk of contracting lung and nasal cancer.
- Chronic formaldehyde exposure can cause menstrual disorders and pregnancy problems in women workers exposed to higher levels.
- Short-term inhalation exposure can result in eye, nose, and throat irritation and respiratory symptoms.

Standards have been set by industry for formaldehyde emissions from all wood products and by the U.S. Department of Housing and Urban Development for wood products in manufactured homes.

American National Standards Institute (ANSI) standards for particleboard flooring products restrict formaldehyde gas emissions to 0.2 parts per million (ppm) as measured in the American Society for Testing and Materials (ASTM) large chamber test. All other materials must emit less than 0.3 ppm to meet the ANSI standard. HUD regulations for materials used in mobile homes limit emissions to 0.3 ppm. According to EPA's Integrated Risk Information System, if these levels were to occur in indoor air, and an individual had lifetime exposure, the risk of cancer would be higher than generally considered acceptable.



However, because formaldehyde is believed to cause cancer, and because no threshold has been determined below which exposures do not increase the risk of cancer, formaldehyde remains a health concern even at these lower levels.

Greener Choices

Alternative Fiber Sources

Clear the Air, Clear the Fields by Using Agricultural Waste Fiber

Straw is the stem of a small-grain cereal plant, such as wheat or rice, or the shaft left after the growing of grass for grass seed. While some straw is left to condition the soil, in many places it is cleared from fields after grain harvest by burning, which has caused serious air pollution problems. For example, some 500,000 acres of rice fields in California's Sacramento Valley produce about 1.5 million tons of rice straw that traditionally was burned in the field each year. Such burning was creating 56,000 tons of carbon monoxide annually in California alone, along with particulate matter, carbon dioxide, and other air pollutants.

Because of adverse health effects associated with such pollution, California is phasing out straw burning and is requiring rice growers to find alternative means of straw disposal. Meanwhile, wheat production in the Midwest and the cultivation of bluegrass for

grass seed in the Northwest are producing large amounts of straw. For PB and MDF manufacturers, this is a case of one industry's trash being another industry's treasure. In fact, the amount of residual straw generated by U.S. agriculture (estimated at over 100 million metric tons) far exceeds present and future fiber requirements for PB and MDF manufacture.

Bagasse, another source of fiber for PB and MDF, is the residue from the processing of sugar cane for sugar production. This waste product is currently disposed of in large quantities in Louisiana, Florida, and Hawaii. In fact, more than 4.5 million tons of bagasse generated each year in the United States is typically burned in steam boilers, which creates more air emissions than other energy sources, such as natural gas.

Using straw or bagasse as the fiber for PB and MDF provides an alternative to burning straw in fields or disposing of bagasse by burning it in steam boilers. Although processing straw into PB and MDF is similar to processing wood residues, breaking straw into fibers requires less processing and less drying, therefore less energy use.



In addition, the properties of strawboard, such as internal bond strength, resistance to rupture, moisture resistance, and screw-holding strength (as measured by tests developed by the American National Standards Institute or the American Society for Testing and Materials), are equal to or better than wood-based PB and MDF. And, because formaldehyde-based resins are not used with board made from straw and bagasse, the resulting product does not carry the health risks associated with formaldehyde.

Currently, six plants in the United States produce PB and MDF from straw and bagasse. These include strawboard plants in North Dakota (Primeboard, Inc.), Minnesota (Isoboard Enterprises), California (Fiber Tech), and Idaho (Pacific Northwest Fiber) and sugar cane bagasse plants in Louisiana (Acadia Board) and Hawaii (Hawaiian DuraGreen). Another strawboard plant, which will use rice straw, is under construction in California. These plants are located near the sources of the straw or bagasse to keep transportation to a minimum.

Reduce the Waste Stream through Use of Post-Consumer Wood and Paper

The solid-waste stream in the United States contains approximately 16 million tons of recoverable solid wood waste from the municipal, construction, and demolition solid-waste streams. In addition, 79 million tons of waste paper disposed of each year could provide another source of fiber for PB and MDF. Using post-consumer wood and paper waste for PB and MDF could potentially divert some 95 million tons from landfills and decrease the harvesting of trees. Locating PB and MDF plants near urban areas would provide access to wood and paper wastes and

Some 500,000 acres of rice fields in California's Sacramento Valley produce about 1.5 million tons of rice straw that traditionally was burned in the field each year.

place the finished product in proximity to users.

One company, Homasote, produces an MDF-like board from post-consumer recycled waste paper, recycling approximately 80,000 tons per year. Homasote uses a formaldehyde-free wax emulsion as the binder and a closed-loop manufacturing process that recycles all water used.

Unfortunately, while there are PB products available that are made from recycled wood products, such as waste pallets, they use formaldehyde-based resins.

Reduce the Waste Stream by Using Pre-consumer Recycled and Recovered Wood Residues

Most PB and MDF contains wood residues from lumber and plywood production. The PB and MDF industries, along with other panel industries, consume approximately 10 million metric tons of these wood residues per year. Depending on the plant and the process, these raw materials may be considered pre-consumer recycled content or recovered materials.

Pre-consumer and recovered materials are those that otherwise would end up in the solid waste stream. PB and MDF with high content of pre-consumer and recovered materials divert wood waste from disposal and is an indication that little or no wood fiber was produced and harvested for direct use in the product. Some manufacturers have had the pre-consumer and recovered material content of their PB and MDF

certified by independent certification organizations. Most producers of PB and MDF with pre-consumer recycled wood content, however, use formaldehyde resins in the board.

Promote Sustainable Forest Practices by Using Sustainably Managed Wood Sources

Even if the wood fiber for PB and MDF is pre-consumer recycled and recovered material, by demanding that this wood fiber be from trees grown and harvested in a sustainable manner, builders can reduce the overall impacts of forestry practices for lumber and plywood products. There are organizations that certify wood products that have



been produced with wood from sustainably managed forests. For instance, the Forest Stewardship Council and its independent certifiers apply criteria to certify that the source of wood for products is a “well-managed” forest: one that maintains the essential characteristics of a natural forest before and after a timber harvest. FSC standards of

well-managed forestry carefully balance ecosystem health with the amount of timber harvested from the forest. Invasive management techniques, like clear-cutting and biocide use are minimized. Non-invasive management practices such as riparian buffer zones, balanced-age distribution, and integrated pest management are always preferred over invasive techniques. PB is available containing wood fiber derived from sustainable forestry, but these products currently use formaldehyde-based resins.

Alternative Resins

Methylenediphenyl Isocyanate (MDI)

The most widely used alternative to urea formaldehyde for PB and MDF is methylenediphenyl isocyanate (MDI). Unlike most wood-based PB and MDF products that are made with formaldehyde-based adhesives, products made with MDI do not emit a toxic gas during use. While MDI has other advantages, such as the ability to bond to wood particles with higher moisture content and requiring less dryer energy and lower press temperatures (which may lower air emissions), there are concerns about MDI toxicity for workers exposed during PB and MDF manufacturing. MDI can be used

MDI TOXICITY

MDI is a hazard for workers in PB and MDF plants, although controls to prevent exposure are generally in place. MDI can cause dermatitis and respiratory diseases in workers and may alter the immune system, resulting in sensitization of the respiratory system and asthma-like reactions. It is not considered a carcinogen in humans, but there is limited evidence of tumors in animals. While OSHA’s Permissible Exposure Limit for MDI in the workplace is less than that for formaldehyde (0.02 ppm versus 0.75 ppm), MDI does not present an exposure risk in the finished PB and MDF products.

for wood-based PB and MDF and for products made with agricultural residues, for which formaldehyde-based adhesives are generally not suitable.

Naturally Derived Adhesives

Environmental and human health concerns have prompted researchers to develop naturally derived adhesives and resins for wood products. While alternatives, such as resins manufactured from furfuryl alcohol or lignin chemicals, have been demonstrated in the laboratory, they have not been embraced by

manufacturers of PB and MDF. A strawboard, available in the United Kingdom under the name Stramit, uses the natural lignin in straw, together with high temperatures and pressures, to bind the straw fiber; this type of strawboard is not currently manufactured in the United States.

Market Survey: What's Available

There are three categories of greener PB and MDF available on the market:

1. Agricultural Waste Fiber, Formaldehyde-Free: agricultural residues that would have been burned, bonded with a formaldehyde-free resin;

2. Post-Consumer Waste Fiber, Formaldehyde-Free: post-consumer paper waste, bonded with a formaldehyde-free resin;

3. Recovered Wood Fiber and Formaldehyde-Free: pre-consumer wood residues, bonded with a formaldehyde-free resin.

Recommended Particleboard and Fiberboard Products

AGRICULTURAL WASTE FIBER, FORMALDEHYDE-FREE

MANUFACTURER (BRAND)	PRODUCT DESCRIPTION	FIBER SOURCE	RENEWABLE/SUSTAINABLY HARVESTED	PRODUCT AVAILABILITY	PERFORMANCE STANDARDS
Isoboard (Isoboard, StorageBord, ShelfBord and IsoUnderlay)	Strawboard	Wheat Straw	Annually renewable	Home Depot, Lowe's, Isobord's Global Sales Office	Meets ANSI-M3 (particleboard) standards at Guaranteed Property Performance Levels
PrimeBoard	Strawboard	Wheat Straw	Annually renewable	Multiple distributors	Meets ANSI-M3 standards
Pacific Northwest Fiber (PacificBoard)	Strawboard	Bluegrass Straw	Annually renewable	Available for immediate shipment	Moisture-resistant; laboratory tests conducted by company show superior strength, compared to wood-based particleboard
FiberTech	Agrifiber composite panel (Mainly door cores; also some industrial board and underlayments)	Rice Straw	Annually renewable	Door cores sold to door manufacturers	Meets ANSI standards for particleboard and fiberboard
Acadia (DuraCane)	Particleboard	Bagasse	Annually renewable	Available directly from the company	Excellent moisture resistance, high hardness and moduli of rupture (MOR) and elasticity (MOE); exceeds MDF standards
Hawaiian DuraGreen	Particleboard	Bagasse	Annually renewable	Panel Source International is the exclusive sales agent	Highly moisture-resistant; internal bond values greater than 200 psi; tight screw holding (contact company for details)

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Recommended Particleboard and Fiberboard Products

POST-CONSUMER WASTE FIBER, FORMALDEHYDE-FREE

MANUFACTURER (BRAND)	PRODUCT DESCRIPTION	FIBER SOURCE	RENEWABLE/SUSTAINABLY HARVESTED	PRODUCT AVAILABILITY	PERFORMANCE STANDARDS
Homasote	Fiberboard	100% post-consumer recycled newsprint	Post-consumer newsprint supply exceeds current demand	Most lumber and home center locations; network of dealers	Products comply with building codes for various applications (contact company for details)

RECOVERED WOOD FIBER, FORMALDEHYDE-FREE

MANUFACTURER (BRAND)	PRODUCT DESCRIPTION	FIBER SOURCE	RENEWABLE/SUSTAINABLY HARVESTED	PRODUCT AVAILABILITY	PERFORMANCE STANDARDS
SierraPine (Medex, Medite II and Medite-FR)	Medium-density Fiberboard	100% recovered and preconsumer recycled wood fiber	N.A.	Multiple distributors	Meets ANSI 208.2-1994 standards for MDF

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MANUFACTURER CONTACT INFORMATION

Isoboard.	http://www.isoboardenterprises.com	503-242-7345
Primeboard.	http://www.primeboard.com	701-642-1152
PacificBoard	http://www.pacificfiber.com	208-686-6800
FiberTech		530-458-4547
Acadia		727-393-9668
Hawaiian DuraGreen	http://www.hawaiianduragreen.com	808-877-2942
Homasote	http://www.homasote.com	800-257-9491
SierraPine	http://www.sierrapine.com	800-334-2250



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Guidelines and Standards

EPA Comprehensive Procurement Guideline for Fiberboard

EPA has adopted a Comprehensive Procurement Guideline for Structural Fiberboard containing recovered materials (80–100% recovered material required). Structural fiberboard is a panel made from wood, cane, or paper fibers matted together which is used for sheathing, structural, and insulating purposes. Examples of these products include building board, insulating formboard, and sheathing. Any Federal agency, or any state agency that is using appropriated Federal funds for procurement, is required to

purchase products meeting this guideline. See <http://www.epa.gov/cpg/products/fiberbrd.htm>.

U.S. Department of Agriculture Biobased Products List

A 1998 Executive Order directs the U.S. Department of Agriculture to develop a list of biobased products that can guide agencies in their purchasing policies. Once the list is published, it may also be a useful reference. See <http://www.usda-biobasedproducts.net>.

Performance Standards

The American National Standards Institute (ANSI) and the American Society for Testing and Materials (ASTM) have adopted

several performance standards for PB and MDF. If you are purchasing PB and MDF, you should determine the level of performance you need (a waterproof product, for example) and inquire as to whether the product meets those performance standards. For PB and MDF made from agricultural fiber, specifying the performance characteristics required may yield more eligible products than just referencing test methods, since many of the test methods for PB and MDF were developed with wood fiber products in mind. The recommended products table provides available information about performance standards met by the individual products.

GREEN REPORT

GREEN SEALS' S *Choose*

PRINTING AND WRITING PAPERS

- ✂ Americans use approximately 31.5 million tons of printing and writing paper each year, an amount requiring over 535 million trees and more than 12 billion gallons of oil to produce
- ✂ More paper products are now recovered than sent to landfills in the US, yet 65 percent of used printing and writing paper still ends up in the waste stream
- ✂ The pulp and paper industry, ranks first in use of industrial process water, third in toxic chemical releases and fourth in emissions of the air pollutants known to impair respiratory health

It is unlikely that use of paper as a medium for communication will diminish in the near future — if ever. Despite technological advances and visions of the “paperless office,” we are actually using more paper than before the electronic age that was supposed to have rendered us paper-free! Every day millions of sheets of business paper are used to meet a multitude of needs, whether for advertising, formal correspondence or professional publications. Although important functions, these pursuits do not come without detriment to the environment and, in turn, health. Paper production and use — from forest management and tree harvesting to pulping and bleaching as well as handling used paper — can create severe environmental impacts.

The use of virgin fiber in paper raises concerns regarding how forests are managed, trees are harvested and

pulp is processed. If harvesting trees for pulp production is done in a way that is unsustainable for the long-term health of the forest, then the myriad of other benefits derived from the forest will be lost.

Despite technological advances and visions of the “paperless office,” we are actually using more paper than before the electronic age.



For instance, trees help to offset global warming by absorbing carbon, while forestlands conserve biodiversity by providing habitats for both plant and animal life to exist in healthy populations. In addition, non-timber forest products of value range from medicinal plants and wild mushrooms to scenic views and recreation. Imagine what it would be like without large tracts of forested land in which to roam!

In addition to potential impacts attributed to obtaining raw materials for paper production, a host of adverse environmental and health effects can be associated with virgin pulp processing. For example, producing pulp and paper requires large quantities of water and chemicals, and is also quite energy-intensive. The toxic air emissions and wastewater effluent from paper mills can cause serious problems, particularly for local communities and ecosystems. Chemicals used in pulping and bleaching virgin fiber, such as chlorine, are not only dangerous to manufacture and handle, but their use generates by-products which are highly toxic to humans and aquatic life when

released into the environment. These by-products include actual or potential carcinogens, and compounds that can severely affect the reproductive and endocrine systems of exposed populations.

Simple changes in our paper use and purchasing practices can help limit the depletion of forests and loss of habitat, reduce pollution and decrease the stress on our landfills. To this end, Green Seal recommends papers with at least 30% post-consumer recycled content and the use of chlorine-free production methods. Any pre-consumer or virgin fibers used in the recycled content paper must not be bleached with elemental chlorine. Several companies are using chlorine derivatives, such as chlorine dioxide, in place of elemental chlorine, which is

Federal Executive Order 13101 mandates that all federally purchased paper should contain no less than 30% post-consumer recycled content.

acceptable given sufficient post-consumer recycled content. Green Seal also recommends some papers made with 100 percent virgin tree pulp, if processed completely without chlorine or its derivatives. Green Seal encourages both the increased use of post-consumer recycled fibers and the elimination of chlorine usage.

Green Seal reviewed the products of 20 manufacturers and evaluated them against the environmental criteria mentioned above. A list of the papers that meet the criteria is included at the end of this report. Purchasing products that are chlorine-free and include post-consumer fibers will reduce the strain on natural resources, promote resource conservation and waste reduction, and minimize toxic emissions.

Making the Grade

Grades are used to distinguish among the different uses for a particular paper, which necessitate different performance characteristics. In this *Choose*

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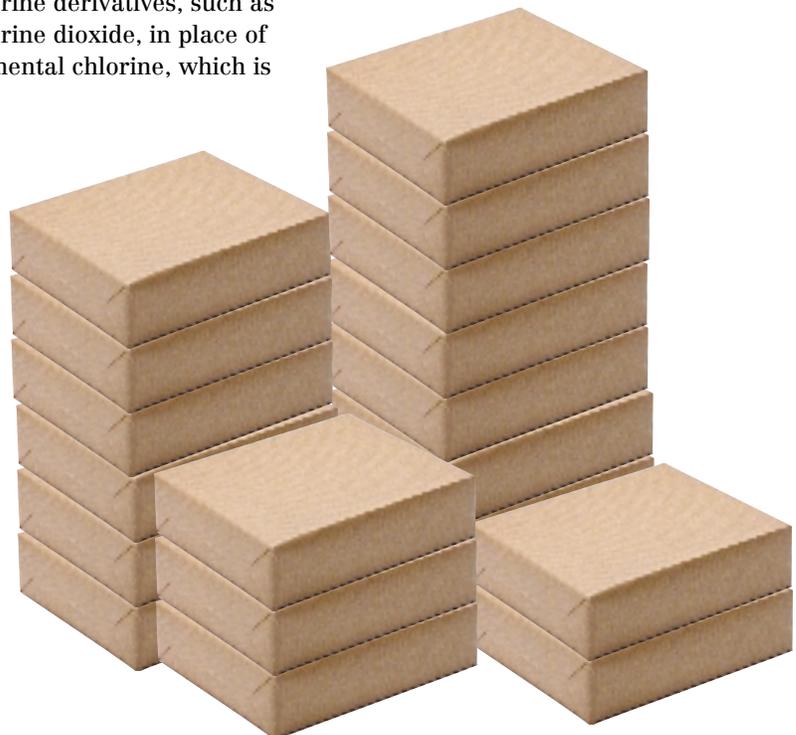
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Editor, *Debra Shepherd*

Design, *Cutting Edge Graphics*

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Green Report, we focus on writing, text and cover papers, some of the most common grades of printing and writing papers used by businesses. They are often of heavier basis weight and utilize more coatings and inks than basic copy paper, a topic to be covered in an upcoming issue of the *Choose Green Report*.

■ **Writing (or Bond)** — Writing papers are commonly used for business letterhead and forms. The paper surface readily accepts ink and can withstand erasures without damaging the surface. These qualities render the papers most suitable for use with pen and ink or typewriters, but they are also adequate for printing.

■ **Text** — Text papers are known for the range of textures, colors and basis weights available in this grade. They are often treated to make them more water-resistant and facilitate offset lithographic printing. Text papers are commonly used for brochures and booklets.

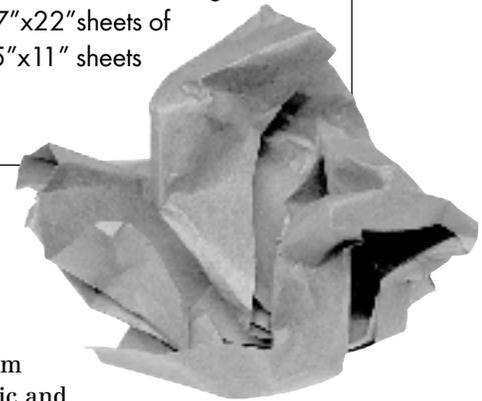
■ **Cover** — Cover papers are often made in a heavier basis weight to complement their text counterpart. These papers are extremely durable, stable and maintain a uniform printing surface. Cover stock can be found in various textures and colors, and is commonly used for booklet covers and small binding jobs.

Due to the additional fillers, colors and coatings often used in these grades, recycling them results in more — and more hazardous — sludge than when recycling other paper products, such as corrugated cartons, newspapers and copy paper.

Paper: Basic Sizes & Basis Weights

GRADE	BASIC SIZE (in)	COMMON BASIS WEIGHTS (lbs / ream)
Writing Papers	17 x 22	20 - 40 #
Text Papers	25 x 38	30 - 100 #
Cover Papers	20 x 26	50 - 130 #

Remember, *basis weight* is the weight of a ream of paper at its basic size. So, a ream of 17"x 22" stationery (its basic size) that weighs 24 pounds is called "24#". This ream of 17"x22" sheets of 24# stationery produces four reams of 8.5"x11" sheets (each weighing six pounds).



Raw Material Selection

Forests and timberlands, if properly managed, can provide trees as a source of raw materials for paper as well as innumerable other economic and ecological benefits. Certification that forest products such as lumber were harvested from sustainably managed lands is difficult, as it requires verifiable chain-of-custody information from the forest to the retailer. This can be even more challenging with regard to pulp, which is further down the supply chain and is a commodity that paper mills may purchase from various sources. However, the Forest Stewardship Council (FSC) has begun to address certification of this commodity. In fact, Lyons Falls Pulp & Paper is the first company in the world to offer paper certified by the FSC as containing pulp from sustainably managed forests. Because so few paper products in the United States are certified in this manner, it is not yet a prevalent enough attribute to use as a criterion for selection.

There are several alternative fibers on the market for producing paper, such as kenaf, hemp, agricultural residual materials,

denim fabric and even paper money. The technologies are improving such that it is feasible to use papers made from these less conventional fibers. However, unless these fibers are cultivated and harvested in an environmentally responsible manner and obtained from a regional source, the benefits of using a tree-free paper can be negated by the environmental impacts associated with agricultural practices, manufacture or transportation. Furthermore, tree-free papers may have a distinct color or texture that is not always suitable for general printing or writing applications and may be priced above what some businesses or organizations can afford. Thus, we have chosen to focus this report on the use of post-consumer fibers and chlorine-free bleaching methods, and to recommend paper products that are most commonly used and readily available.

Recycled Content

Recycled fibers have been used in paper for quite some time, as paper manufacturers traditionally reprocess mill scraps in paper production. This **pre-consumer** material may include shavings, cuttings, and unused paper stock from previous jobs or even other mills. Utilizing this source of recycled material has been and will remain common industry practice, and is not considered a significant factor in resource use reduction or pollution prevention. It is the use of **post-consumer** recycled content that is important for conserving resources and minimizing pollution and waste. Post-consumer fiber comes from paper that has served its original purpose for the end user, and is subsequently diverted from the stream of waste going to a landfill or an incinerator. Higher post-consumer recycled content also means fewer trees are needed to meet the demand for paper. The **total** recycled content refers to the amount of post- and pre-consumer fibers contained in the paper.

Using paper that contains sufficient levels of post-consumer recycled fibers is generally preferable to using paper that is made with 100 percent virgin pulp for several reasons. First, recycling one ton of paper saves 3 cubic yards of increasingly scarce landfill space. Also, although the paper may have been chlorine bleached for its initial use, the impacts cannot be undone. But any chlorine residues, as well as colors and finishes, may cause further harm by leaching from landfills or through air pollution created during incineration. Finally, virgin pulp, even when processed completely without chlorine or derivatives, still requires the harvesting of trees.

From a life cycle perspective, recycled fibers cause less environmental harm than virgin

pulp even after accounting for slight increases in resource use and pollution from paper collection and processing when compared to its disposal.

Pulp Processing

The most common processes used to extract cellulose fiber from wood are mechanical, chemical or a combination of the two. The mechanical method involves grinding whole logs or chips, resulting in groundwood pulp that contains impurities such as lignin. Because of this, the groundwood pulp is primarily suitable for applications such as newsprint, but it may also be used as filler in higher-grade papers. Chemical pulping requires soaking wood chips in a sulfate or sulfite chemical bath, often accompanied by heat and pressure, to eliminate most of the impurities. This pulp is used to make some of the higher paper grades. Mechanical pulp production typically uses more energy but

produces less water pollution than chemical pulping.

Bleaching removes any remaining impurities and brightens the material. Elemental chlorine was once considered to be the most effective method to remove impurities and dissolve lignin, but recent studies have shown that the chlorine-bleaching process produces dangerous organo-chlorine compounds such as dioxins and furans. Studies conducted in the US and abroad indicate a link between dioxin exposure and increased occurrences of certain kinds of cancers, and organo-chlorines mimic natural hormones, adversely impacting the reproductive and immune systems, and causing developmental abnormalities. These compounds in mill wastewater are discharged into the environment, where they persist and accumulate in the ecosystem and up the food chain. With more than 1.5 trillion gallons of wastewater being produced by the paper industry each year, the increased use of alternatives to

BLEACHING DEFINITIONS

Papers are often identified according to bleaching classification. Papers bleached with a derivative of chlorine, such as chlorine dioxide, instead of elemental chlorine are called "*elemental chlorine free*" (ECF). Papers bleached without any chlorine or chlorine derivatives are sometimes referred to as "*totally chlorine free*" (TCF). Recently, a new term has been introduced in attempts to further refine the term TCF: "*process chlorine free*" (PCF). PCF and TCF are both intended to identify paper which has not been bleached with chlorine or chlorine derivatives in its current production cycle. However, use of PCF is intended for paper that contains fibers from recovered paper that may have been bleached with chlorine before it was recycled, while TCF would be used for paper that contains only fibers that have never been chlorine bleached. In other words, PCF paper would contain recycled fibers while TCF paper can only contain virgin fibers. Because there is not consensus on the use of these terms, Green Seal will group the papers in the table simply by using generic, descriptive terms rather than using these acronyms.

chlorine bleaching is greatly needed. Use of chlorine dioxide, a derivative of chlorine, can reduce these toxic releases by approximately 90% compared to the use of elemental chlorine. Fortunately, other means of brightening using ozone, hydrogen peroxide or oxygen are now being used, which avoid the releases of chlorine and its derivatives completely.

Positive Paper Purchasing

Aside from the first step of reducing the quantity of paper used, there are other ways to minimize environmental impact through improved purchasing practices.

Reduce basis weight

Knowing the range of basis weights available is relevant in paper selection, especially when trying to mitigate environmental impacts. The **basis weight** is the weight of one ream of paper (500 sheets) in the basic size for that grade. The **basic size** differs among the paper grades (see page 3), and can differ from the standard size of the final product.

The nature of the printing job at hand will generally dictate the grade of paper needed. However, there is often a range of basis weights *within* a given grade, offering flexibility in decision-making. For example, by opting for 20# writing paper instead of 24# stock for business stationery, an office that uses only two reams per week would, in essence, get 10,400 sheets of stationery free per year. This is because the change would save 104 pounds of paper per year, which equals almost 21 reams of the 20# stationery. Select the lowest basis weight acceptable for

CLOSE THE LOOP

Recycling is only viable as long as there is a market for the recycled materials. By buying products with post-consumer recycled content, in conjunction with recycling your own used materials, you will help to support the market for recycled fibers as well as reduce the environmental impacts of your operations. You will likely save money due to a reduction in waste disposal costs, and may even earn revenue from selling recyclable paper.



your printing job. This will reduce the amount of pulp, resources used and waste generated for each sheet of paper.

Select papers with post-consumer recycled fibers

Whenever possible, choose paper made with a minimum of 30% post-consumer recycled fiber. Producing paper with recovered materials not only reduces solid waste and the need for virgin pulp, but also generates less pollution and uses less total energy and other resources than producing paper from virgin fibers.

Use discretion with brightness and bleaching

Certain documents will need to be white, but not always the brightest white available. Most papers with or without recycled content can provide the desired level of brightness and contrast to text or graphics without using chlorine. Evaluate the need for whiteness against the potential environmental and health impacts of bleaching, and choose papers made without elemental chlorine, with preference given towards a completely chlorine free product.

Minimize the use of coatings and colors

Coatings provide performance and aesthetic elements to paper, which may be desirable for particular printed materials. However, recycling paper with coatings, colors or finishes can generate more sludge or harmful waste by-products than untreated paper. Also, this paper may not be included in some office recycling programs. Whenever possible, avoid or reduce the use of papers with these potentially polluting additives.

Recycle your used paper

Develop or strengthen your own recycling program, and ensure that employees and maintenance staff are aware of their roles. Newspaper and corrugated cardboard have achieved high rates of recycling, and higher-grade paper recycling is increasing. However, only 35% of printing and writing paper is recycled, which leaves significant room for improvement. Higher grade papers result in better quality recycled fibers, which can then be used in a wider variety of recycled content products. Finally, by contributing paper for recycling, you are helping to keep prices for recycled products down.

Recommended Printing and Writing Papers

The papers listed in this report generally meet the minimum criteria of having at least 30% post-consumer recycled fiber and being elemental chlorine-free. Many of the papers with recycled content go beyond these baseline criteria, in that they have greater post-consumer fiber and/or they use no chlorine or its derivatives. We have included some papers that are made with 100% virgin fiber, but these are made without any chlorine or chlorine derivatives.



MANUFACTURER BRAND	%P-C	%TRC	BASIS WEIGHT (#)	BRIGHTNESS
Minimum 30% post-consumer recycled content and no elemental chlorine				
Mohawk Paper Mills Mohawk Options: Whites - Sands	100	100	28 W 70 T 80 C	Colors
Mohawk Paper Mills Mohawk Options: Whites	30	30	28 W 70 T 80 C	Naturals and Heathers
Mohawk Paper Mills Mohawk Options: Colors	30	30	70 T 80 C	Heathers
Mohawk Paper Mills Mohawk Satin	30	30	24, 28 W 60, 70, 80 T 65, 80 C	90 - Cool White
Mohawk Paper Mills Mohawk Vellum Whites	30	30	24, 28 W 60, 70, 80, 100 T 65, 80 C	90 - Cool White
Mohawk Paper Mills Mohawk Vellum Colors	30	30	24, 28 W 60, 70 T 65 C	Colors
Mohawk Paper Mills Mohawk Superfine: White Recycled	30	30	24, 28 W 70, 80 T 65, 80 C	89
No elemental chlorine or chlorine derivatives				
Mohawk Paper Mills Mohawk Options TCF	0	0	24, 28 W 80 T 65, 80 C	N/A
Minimum 30% post-consumer recycled content and no elemental chlorine or chlorine derivatives				
Badger Paper Mills Envirographic 100	100	100	20, 50 T	85
Domtar Papers Sandpiper	100	100	24 W 60, 70, 80 T 65, 80 C	Colors
Fort James Eureka! 100	100	100	20 W	84
New Leaf EcoOffset	100	100	50, 60 T	85
New Leaf Everest	80	80	24 W 80 T 80 C	90

NOTES T = Text %P-C = Percent Post-Consumer Recycled Content
 C = Cover %TRC = Percent Total Recycled Content
 W = Writing * amount varies: paper made per customer specification

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Recommended Printing and Writing Papers (cont.)

MANUFACTURER BRAND	%P-C	%TRC	BASIS WEIGHT (#)	BRIGHTNESS
Minimum 30% post-consumer recycled content and no elemental chlorine or chlorine derivatives				
New Leaf New Leaf Satin	75	100	47 T	84
Stora Enso Cyclus Print	75	100	61-100 T 63, 74 C	76
Stora Enso Cyclus Offset	75	100	47-101 T 63, 74, 92 C	69
Rolland New Life DP 100	60	80	20, 24 W	88
New Leaf Reincarnation	50	100	60-105 T 80-115 C	88
Arbokem Downtown Paper #3	50	50	50, 60 T	82
Fraser Papers Genesis PCF	30	100	61-80 T 80 C	N/A
Neenah Paper Environment - Cream only	30	100	24 W 80 T 80 C	N/A
Stora Enso Reprint	30	50	47-100 T 63, 74 C	84
Lyons Falls Pulp & Paper FSC Certified (see text)	~30*	~30-70*	40-70 T	Varies
Minimum 30% post-consumer recycled content and no elemental chlorine				
Fraser Papers Genesis	100	100	24 W 60-100 T 65-80 C	N/A
Gilbert Paper Correspond 25% Cotton Recycled	30	100	20, 24 W	93
Gilbert Paper Union Watermarked 25% Cotton	30	100	20 W	93
Gilbert Paper Neutech 25% Cotton Recycled	30	100	20, 24 W	93
Neenah Paper Environment	30	100	24 W 80 T 80 C	91 - White 95 - Ultra Bright White
Gilbert Paper Chadwick 25% Cotton	30	85	20, 24 W	93
Gilbert Paper Gilbert Manuscript 25% Cotton	30	85	26 W	N/A
Fraser Papers Halopaque	30	80-100	40-105 T 65-80 C	86 - Blue White 72 - Cream White
Fraser Papers Troy Book	30	80-100	40-80 T	80 - Blue White 72 - Cream White
Fraser Papers Miami Book	30	80-100	40-80 T	78 - Blue White 68 - Cream White

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Recommended Printing and Writing Papers (cont.)

MANUFACTURER BRAND	%P-C	%TRC	BASIS WEIGHT (#)	BRIGHTNESS
Minimum 30% post-consumer recycled content and no elemental chlorine				
Gilbert Paper Neutech PS	30	60	24 W 80 T 80, 120 C	90
Gilbert Paper Gilbert Cover Recycled	30	60	80 C	93
Gilbert Paper Gilcrest	30	60	24 W 80 T 80, 120 C	93
Gilbert Paper ESSE	30	60	24, 48 W 70, 80 T 80, 110 C	93
Gilbert Paper Oxford	30	60	24 W 80 T 80, 100 C	88
Gilbert Paper Realm	30	60	24 W 70, 80, 100 T 80, 100 C	94
Gilbert Paper Voice	30	60	24 W 70, 80 T 80, 100 C	93
Neenah Paper Classic Linen	30	60	24 W 70, 80 T 80, 100, 120, 130 C	91
Neenah Paper Classic Crest	30	60	20, 24 W 80 T 80 C	91
Neenah Paper Classic Columns	30	60	24 W 80 T 80, 120 C	91
Neenah Paper Classic Laid	30	60	20, 24 W 70, 75, 80 T 65, 80, 88, 120 C	91
Neenah Paper Neenah Bond - 25% Cotton Bond	30	60	24 W	86
Neenah Paper Atlas Bond - 25% Cotton Bond	30	60	20, 24 W	91 - White 95 - Ultra Bright White
Fraser Papers Passport	30	50-100	50-80 T 65, 80 C	N/A
Domtar Papers KAOS	30	50	28 W 70 T 80, 100 C	Colors
Fraser Papers Synergy	30	50	60-80 T 65-80 C	90 - White 72 - Natural
Gilbert Paper Chadwick Cover - Smooth	30	30	80 C	93
Hammermill Premiums Hammermill Bond	30	30	20, 24 W	92

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Recommended Printing and Writing Papers (cont.)

MANUFACTURER BRAND	%P-C	%TRC	BASIS WEIGHT (#)	BRIGHTNESS
Minimum 30% post-consumer recycled content and no elemental chlorine				
International Paper Savings DP	30	30	20, 24 W	84
International Paper Fore DP Colors	30	30	20, 24 W	84
International Paper Accent Opaque	30	30	50, 60, 70 T 65, 80 C	90
Rolland New Life Opaque Repro	30	30	50, 60, 70 T	91
Weyerhaeuser Recycled Lynx Opaque	30	30	50, 60, 70 T 65, 80 C	92
Weyerhaeuser Recycled Lynx Opaque Laser Guaranteed	30	30	20, 24 W 50, 60 T	92
Weyerhaeuser Recycled Husky Offset	30	30	50, 60, 70 T	84
Domtar Papers Naturals	20-45	55-100	24 W 60, 70, 80 T 80 C	Colors
No elemental chlorine or chlorine derivatives				
Lyons Falls Pulp & Paper Turin Book TCF	0	0	40-70 T	67 - Natural
Lyons Falls Pulp & Paper Pathfinder Tradebook TCF	0	0	40-70 T	69 - Natural 78 - White

NOTES

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%P-C = Percent Post-Consumer Recycled Content
%TRC = Percent Total Recycled Content
* amount varies: paper made per customer specification

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MANUFACTURER CONTACT INFORMATION

Arbokem	604.322.1317	Lyons Falls Pulp & Paper	315.348.2228
Badger Paper Mills	800.826.0494	Mohawk Paper Mills	800.TheMill
Domtar	800.6DOMTAR	Neenah Paper	800.338.6077
Fort James	800.854.5345	New Leaf Paper	888.989.5323
Fraser Papers	937.859.5101	Rolland	800.388.0882
Gilbert Paper	800.445.4465	Stora Enso North America	888.407.8672
Hammermill	800.242.2148	Weyerhaeuser	800.523.5590
International Paper	901.763.7800		



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- **Recommended Printing and Writing Papers**
- *Picking Paper*
- *Positive Paper Purchasing*

RECOMMENDED READING

The Consumer's Guide to Effective Environmental Choices: Practical Advice from the Union of Concerned Scientists

by Michael Brower and Warren Leon
Three Rivers Press, \$15

Natural Capitalism: Creating the Next Industrial Revolution

by Paul Hawken, Amory Lovins, and L. Hunter Lovins
Little, Brown and Company, \$26.95

Mid-Course Correction: Toward a Sustainable Enterprise

by Ray C. Anderson
The Peregrinzilla Press, \$17.95

Sustainable Cuisine: White Papers

Earth Pledge Foundation, Series on Sustainable Development



GREEN

R E P O R T

GREEN SEALS
Choose

RIGID QUICK SERVE FOOD PACKAGING



In 1996, 1.8 million tons of quick serve food packaging (plates, cups, bowls, and other products) were thrown away. It would take, on average, 132,743 garbage trucks to carry this amount of packaging—which, if lined up bumper-to-bumper, would stretch from Philadelphia to Chicago.



Each American throws away an average of 100 polystyrene cups each year; and the expected lifetime of each cup is over 500 years.

For the average consumer, quick serve food packaging is the paper plate, plastic clamshell or paper wrap in which lunch is carried back to the office. Such packaging can also be found around perishable goods purchased at the grocery store. This *Choose Green Report* focuses on the packaging found in food service operations.

Green Seal appreciates the complex and controversial nature of disposable food service products, and we favor reusable plates and cups when this option is reasonable and breakage costs are minimal. For this issue, we have examined environmental impacts of paper,

plastic and composite disposable quick serve food packaging.

There are two major types of food packaging, rigid (such as a hard clamshell for carryout) and non-rigid (such as a paper wrap for a burger). Whenever food types allow, non-rigid packaging should be used to minimize the volume of the waste going to the landfill and other environmental impacts. However, in some cases it is not feasible to use paper wrap for salads or many entrees.

In this report, Green Seal recommends specific rigid disposable quick serve products based on the type of material, recycled content, bleaching, and biodegradability. Because the package weight can be related to the amount of space it takes up



in a landfill, for whichever type of packaging you choose, Green Seal recommends using the packaging with the lowest weight suitable for your needs. With those criteria in mind, this *Choose Green Report* reviews cups, carryout clamshells, plates, trays, platters and bowls made of paperboard, composite materials or polystyrene.

Overall, Green Seal finds that non-rigid packaging is preferable when appropriate for the packaging needs. Beyond that, Green Seal recommends using packaging made from renewable resources (such as paperboard or composite materials) that contain either some recycled or unbleached content. The packaging should also be easily biodegradable in the environment and as light weight as possible. While the weight of polystyrene packaging is often lighter than that made of paperboard or composite materials, it is not biodegradable or made from renewable resources.

The *Choose Green Report* is published for Green Seal Environmental Partners. To become an Environmental Partner, or to receive a copy of this report, contact Green Seal at (202) 872-6400 x 21 or green Seal@green Seal.org.

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Paper Packaging

Many types of paperboard are available and currently used in the quick serve restaurant industry. Non-corrugated paperboard is most commonly used for cups and plates. Because this type of paperboard can be ordered in non-bleached forms it can have lower production energy needs than other available food packaging options. Another option is molded fiber tableware which is produced by using pre-consumer paperboard pulp to produce approximately 99% reclaimed content products.

Fluted paper quick serve packaging is thinly corrugated paperboard that is often folded into hinged containers. In 1996 the corrugated packaging industry produced 400 billion square feet of corrugated material at a value of \$21 billion. This packaging comes in different sizes identified by different letters of the alphabet. The most common in the food packaging industry is f-flute.

Currently, the most common f-flute configuration consists of three separate layers.

Whenever food types allow, non-rigid packaging should be used to minimize the volume of the waste going to the landfill and other environmental impacts.

Fluted packaging typically requires a protective liner, which is commonly made of low-density polyethylene (LDPE), waxes, or other coatings. The outer layers are virgin bleached kraft paperboard that are coated with protective liners. The inner layer is a corrugated section made of 50% post consumer recycled bleached pulp. This inner layer allows this type of packaging to contain some recycled content without worries about contamination. Those who order f-flute in large quantities can also specify unbleached paperboard.

Starch/Limestone Composite Packaging

This new type of packaging is a combination of potato starch, limestone and wood fiber. Forty-five percent of the packaging is potato starch used as a binding material. Twenty-five percent is limestone and most of the remaining percentage is wood fiber used for product reinforcement. Both the interior and the exterior surfaces are coated, the interior with biodegradable paraffin wax and the exterior with polyvinyl acetate.

The production process involves blending the ingredients together and pouring them into molds. The molds are then heated for less than one minute and the "baked" products are coated with liners.



SUSTAINABLE FOOD SERVICE

Follow the three R's

Sustainable means using renewable resources and making procurement decisions in a responsible manner. This translates into the "three Rs": Reduce, Reuse and Recycle. By working the Rs into your basic philosophy, your company will be on its way to reducing negative impacts on the environment.

1 REDUCE

The first action by any food service operation should be to look for ways to reduce waste. One way to reduce waste is to choose flexible packaging or lighter weight packaging appropriate for your food packaging needs. You can also limit waste disposal by encouraging people to bring their own cups and plates, perhaps by offering these customers a discount.

2 REUSE

Many consumers in food service operations take their food with them; however, if you provide sit down service, reusable cutlery, plates and glasses can provide a significant reduction in solid waste. Studies have shown reusable service items remain the best environmental option even when considering the energy and water used to wash them. For example, a recent study by a Swiss group estimated that typical restaurants use ceramic dishware up to 2500 times. Environmental Defense Fund scientists found that overall, ceramic mugs at 1000 uses have significantly less air and water emissions as well as solid waste and energy needed throughout their production and lifecycle, when compared to paper or polystyrene.



3 RECYCLE

Setting up a recycling bin for food service customers takes several steps toward waste reduction. Recycling reduces fees that are assessed for waste disposal. Recycling also provides manufacturers with the opportunity to reduce production of new virgin materials. The recycled food packaging is usually not recycled back into food packaging materials due to concerns about contamination. Instead, the materials are recycled into other plastic articles.

A California study showed that when mixed with yard waste, the organic parts of the composite were found to totally degrade within 150 days. The non-organic film was also found to degrade after a much longer time, up to 92 weeks. A similar study observed the action of beach surf on the packaging. After 55 minutes in the surf, the composite packaging completely disappeared. After the same amount of time, f-flute remained at least 80% intact, while the polystyrene appeared to be untouched.

Polystyrene

Polystyrene is the most common plastic polymer used in the food packaging industry because it can be found in two versatile forms for use in both hot and cold food products. Expanded polystyrene is often incorrectly referred to by the Dow Chemical trademark name Styrofoam®. In 1997, 120 million pounds of foam polystyrene hinged containers were used in the US food packaging industry. In fact, of the 28 billion plates, platters and bowls produced in the US 57% are

made from foam polystyrene. Because this product's use has grown exponentially, it has become a serious issue for both members of the food packaging industry and the environmental community.

Polystyrene is manufactured through the chemical processing of benzene and ethylene. Because both benzene and ethylene are by-products of petroleum processing, concerns have been raised about the loss of non-renewable fossil fuel resources.

At present, most plastic food packaging applications aside from bottles and cans do not lend themselves to recycling, primarily due to the presence of food residues on the used packaging. While some types of plastic food packaging are technically recyclable, very few operations exist to sort, collect, clean, and process the used packaging into a useable material. In the past decade a network of polystyrene recycling plants has developed in the US, but few food service operations are linked to this system. Because of contamination concerns, few companies recycle the polystyrene back into products to be used in the food packaging industry. If your foodservice operation is interested in exploring plastic foodservice recycling further, contact the Polystyrene Packaging Council at 202-974-5321.

Green Seal's Recommendations for Choosing the Right Food Packaging

■ **Select non-rigid packaging whenever suitable for your service needs.** Non-rigid packaging (e.g., paper or foil wraps) is typically lighter in weight, uses fewer material resources than rigid clamshells or containers with lids and occupies less landfill space.

■ **Use packaging made from a renewable resource.** Wherever possible, avoid quick serve food packaging made from non-renewable, petroleum-derived plastic. At present, only a few types of plastic (e.g., LDPE, HDPE, and PET) are currently being widely recycled, and the recycled plastic material is rarely used in new food packaging products.

Packaging products made from wood fiber or other crop-derived materials can incorporate recycled content and are therefore considered more sustainable.

■ **Buy recycled and/or unbleached fiber content.** If possible select food packaging that contains recycled content, preferably post-consumer recycled content, and that is unbleached. However, if combinations of these attributes are difficult to find, Green Seal recommends products which have either recycled content or unbleached fiber content. Products which contain recycled content help divert industrial and consumer waste paper into new products and use fewer virgin resources. The bleaching of paper with chlorine and its derivatives is energy-intensive and results in a large volume of wastewater and harmful byproducts. Most unbleached products contain 100% virgin fibers. It may not be possible to find a product with recycled content that is also unbleached, but try to look for one or both attributes. Keep in mind that a brown paper coffee cup works just as well as a bleached white one!

■ **Pick products that are easily biodegradable in the environment.** While recent studies have shown that most items do not degrade quickly in the relatively air-less and moisture-less environment of a modern sanitary landfill, the fate of food

HOW TO CHOOSE THE RIGHT FOOD PACKAGING MATERIALS

- Select non-rigid packaging whenever suitable for your service needs.
- Use packaging made from a renewable resource.
- Buy recycled and/or unbleached fiber content.
- Pick products that are easily biodegradable in the environment.
- Use the minimum weight within food packaging type.



packaging is not always straightforward. In a cafeteria or food court setting, most used food packaging usually ends up in a waste receptacle. However, land-based litter contains 38% plastic and 40% paper, while marine litter contains 61% plastic and 11% paper, and much of this debris is packaging waste. Plastic packaging waste in the environment poses a threat to many types of wildlife and marine animals. The animals are often attracted to the food residue on the packaging or in the case of marine animals, mistake the floating plastic packaging for food. For this reason, food packaging

Recommended Rigid Food Packaging Products

Whenever possible non-rigid packaging is recommended over rigid to limit the amount of waste produced and other environmental impacts.

MANUFACTURER/PRODUCT NAME	CLASSIFICATION	RECYCLED CONTENT/ BLEACHING	MATERIALS	BIO-DEGRADABLE
EarthShell® Corp./ EarthShell®	Hinged Containers ¹	~ 45%	Starch Limestone Wood Fiber Paraffin wax liner Polyvinyl acetate liner Polyethylene wax liner	Yes ²
Royal Chinet®/ Tableware Classic White	Molded fiber tableware (plates, bowls, platters and dishes)	~ 99% (reclaimed fiber)	Pre-consumer milk carton board and food grade board No liner	³
Royal Chinet® / Strongholder®	Molded fiber carry trays	~ 99% (reclaimed fiber)	Post-consumer newsprint No liner	³
Royal Chinet® Naturals™ Tableware	Molded fiber tableware (plates, bowls, and platters)	95% (reclaimed fiber)	Pre-consumer milk carton board and food grade board No liner	³
Royal Chinet®/ Paprus® and Savaday® Serviceware	Serviceware plates, circles, trays and bowls	~ 100% (reclaimed and recycled fiber)	Pre and post consumer newsprint	³
Insulair Inc./ INSULAIR™	Paper cups	65%	Post consumer paperboard Polyethylene liner	Yes ²
Royal Chinet®/ Naturals™ Hot Cups	Hot cups	0% Unbleached	Paperboard Polyethylene liner	Yes ²

NOTES

¹ EarthShell plans to produce plates, bowls, trays, hot and cold cups in the future.

² The packaging is easily degradable but at least one coating is not.

³ Although these products appear to be biodegradable, Chinet does not make this claim.

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that is easily biodegradable in the environment can reduce the negative impacts of inappropriate disposal.

■ Use the minimum weight within food packaging type.

Whether paper or composite food packaging is selected, choose the lightest weight product that will meet your performance needs. Lighter weight usually means fewer materials and less impact.

MANUFACTURER CONTACT INFORMATION

EarthShell® Corp. 410-979-1300

Insulair Inc. 415-989-2877

The Chinet® Company 800-244-6382



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IN THIS ISSUE

- **Recommended Rigid Food Packaging**
- *Types of Packaging*
 - Paper
 - Starch/Limestone
 - Polystyrene
- *A Sustainable Cafeteria*

Look for these topics in our next issue on Room Air Conditioning . . .

- **Room Air Conditioners**
- **Package Terminal Air Conditioners**
- **Energy Efficiency**
- **Refrigerant Type**
- **Recommended Products**



GREEN REPORT

GREEN SEALS Choose

ROOM AIR CONDITIONING

- Overall, air conditioners in the US use over 50% of total electricity during summer usage peaks.
- Each year, the energy needed for residential room air conditioning in the U.S. is equivalent to the crude oil transported by 415 supertankers.
- Increasing residential room air conditioner efficiency by 20% would eliminate the need for 49 supertankers of oil.

The heat of the summer is simmering and the air conditioners around the country are going full swing. Approximately 20% of the country's commercial and 30% of the residential buildings use room air conditioners (RACs) as their current cooling method. This does not even include the thousands of packaged terminal air conditioners (PTACs) in use in hospitals, apartments, and hotels around the country. During the hottest part of the summer air conditioners can put a severe strain on the country's power plants.

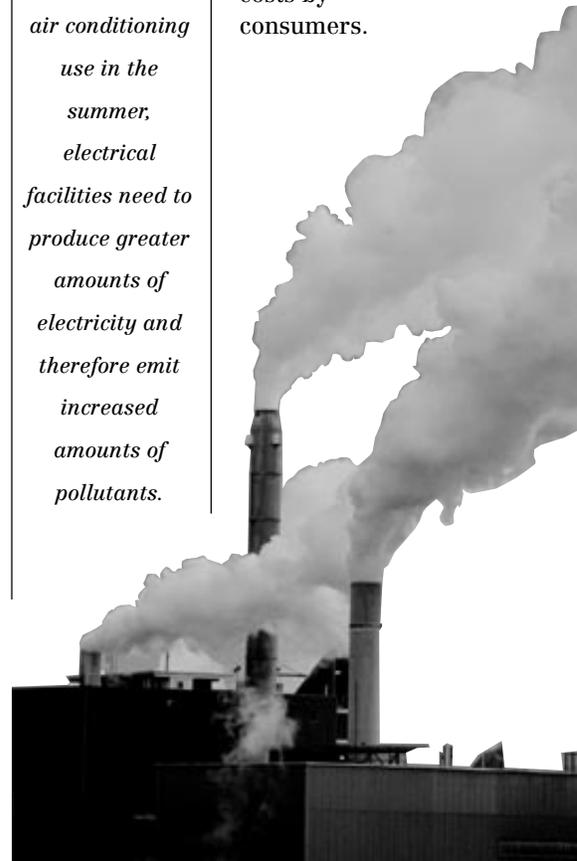
During peak air conditioning use in the summer, electrical facilities need to produce greater amounts of electricity and therefore emit increased amounts of pollutants.

Coal is the most common fossil fuel burned for production of electricity and is known to release dangerous particulate pollutants. The most common pollutants are carbon monoxide, carbon dioxide,

nitrogen oxides, hydrocarbons and various heavy metals. For this reason, manufacturers, the electrical production industry and the environmental community are all encouraging the procurement of high efficiency air conditioning units. Not only do these units cut down on wasted energy and

pollution, but they also reduce usage costs by consumers.

During peak air conditioning use in the summer, electrical facilities need to produce greater amounts of electricity and therefore emit increased amounts of pollutants.



This *Choose Green Report* focuses on air conditioners which can be easily placed in an office space, hotel room, school, hospital or private residence. The two types of air conditioners reviewed are room air conditioners and packaged terminal air conditioners. PTACs are commonly found in hotel rooms and usually can provide both heating and cooling to the rooms by using centrally conditioned air or water. When reviewing these air conditioners Green Seal addressed the issues of cooling capacity, energy efficiency ratio, sensible heat ratio and refrigerant.

Getting Cool

Air conditioners use a combination of coils, refrigerant, compressor and fans to transfer heat from the inside to the outside of a building. A compressed chemical refrigerant absorbs the heat from the inside air and expands. This refrigerant is then pumped through a closed loop system to an outside compressor. It compresses the refrigerant and causes a large increase in

temperature. The hot refrigerant then moves to a coil where a fan blows air over the coil and causes the refrigerant to transfer the trapped heat to the outside air. Some heat pump air conditioners have the ability to reverse the process. By absorbing heat from the outside air and transferring it to the inside air they provide heat during the cold season.

Choosing the Right Air Conditioner

One of the easiest ways to avoid inefficient cooling is to determine exactly how much **cooling capacity** you really need. This number is commonly expressed in BTU/hour units. An air conditioner that is too small for an area may run continuously without ever cooling effectively, while one that is too large for an area will

Not only is it important to consider the location, size and other characteristics of the room, it is equally important to choose an air conditioner which has the highest efficiency available.

continuously cycle on and off and actually increase energy usage. An oversize unit will also be unable to control humidity effectively.

A good method to estimate the amount of cooling you need is shown in Table 1 below. This number can be affected both positively and negatively by some of the factors listed below. Several manufacturers and organizations have developed charts to help incorporate these characteristics into your procurement decision. Keep these characteristics in mind and mention them when purchasing your air conditioner.

Room Direction — Rooms that face either mostly south or west, or have many windows, gain the greatest amount of heat from the sun. These rooms will need an air conditioner with a greater cooling capacity.

Climate — Buildings in cooler and less humid northern climates need less cooling capacity than those in warmer, more humid climates.

Higher Level Rooms — Another important factor when calculating cooling capacity is what type of room is above the one to be cooled. Is it an occupied room that is cooled, or will it remain un-cooled?

The **Choose Green Report** is published for Green Seal Environmental Partners. To become an Environmental Partner, or to receive a copy of this report, contact Green Seal at (202) 872-6400 x 21 or [greenseal@greenseal.org](mailto:green Seal@greenseal.org).

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TABLE 1:

CALCULATING COOLING CAPACITY

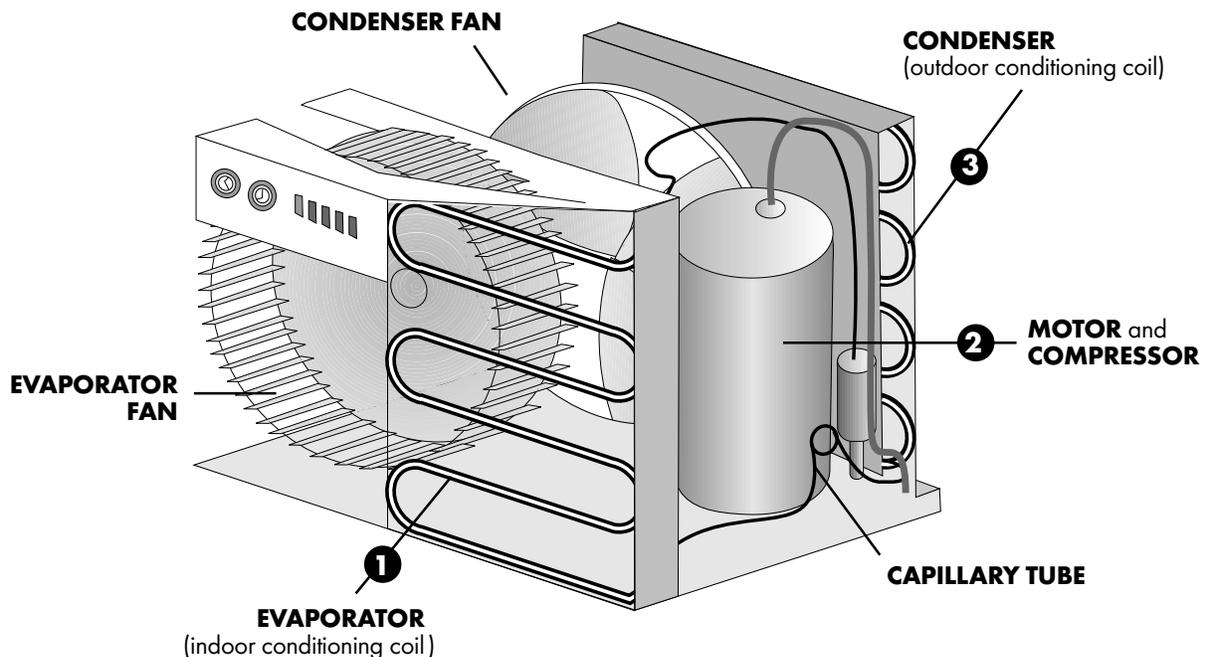
A good rule of thumb to estimate the amount of cooling capacity you need is to multiply the area of floor space (ft²) by a factor of 10 and add 3,000.

For example, the amount of cooling capacity for a 20-foot by 20-foot room would be:

$$[400 \text{ ft}^2 \times 10] + 3,000 = 7,000 \text{ Btu/hour}$$

HOW A ROOM AIR CONDITIONER WORKS

A room air conditioner performs several functions: it cools the air and removes humidity; it circulates air and filters out dust; and in some cases it also provides heating. The diagram below shows how a RAC operates. A North American room air conditioner consists of components encased in a cabinet. This cabinet is segmented into indoor and outdoor sides, which are separated by an insulated divider wall designed to reduce heat transfer and noise. The evaporator and evaporator fan are on the indoor side. The outdoor-side components are the compressor, condenser, capillary tube, motor, and condenser fan.



1 A room air conditioner provides cooling by drawing warm air from the space or room over the **evaporator** (indoor coil). The air gives up its latent and sensible heat as it passes over this coil. Humidity is reduced, since air is cooled below its dewpoint, and water precipitates out of the air. Cooled, drier air then is delivered back to the space or room by the evaporator fan.

2 The **compressor** raises the pressure of the refrigerant, which increases its temperature to a level higher than that of the outside air.

3 Heated refrigerant vapor flows on to the **condenser** (outside coil), where it is cooled by a fan blowing outside air over the coils. When cooled, the refrigerant condenses to a high-pressure liquid. The resulting liquid refrigerant flows through a capillary tube where its pressure and temperature are reduced. The refrigerant then re-enters the **evaporator** – and the cycle repeats.

The **motor** operates both the evaporator fan and the condenser fan.



The graphic and description above are provided courtesy of E SOURCE, an information services company providing organizations with unbiased, independent analysis of retail energy markets, services and technologies.

Is the room above it a storage area that is insulated or un-insulated? Or perhaps the room to be cooled is directly below a hot roof.

Capacity — Lastly, consider the number of people that will occupy the space on a regular basis. A larger number of people in an area will need a greater cooling capacity to reach a comfort level.

Not only is it important to consider the location, size and other characteristics of the room, it is equally important to choose an air conditioner which has the highest efficiency available. In the past the most efficient machines were small because these machines had a higher ratio of coil size to capacity. Most manufacturers were limited by the amount they could increase the coil surface size and maintain a relatively small unit. However, recent advances in cooling technology have changed the efficiency trends and, as this *Choose Green Report* shows, any size air conditioner can be found with a high efficiency ratio!

The **Energy Efficiency Ratio (EER)** is the ratio of the cooling output divided by the power consumption; it is commonly expressed in BTU/Watts x hour units. The EER is probably the most important quantitative number in through-the-wall type of air conditioning. Any off-season energy usage is not included in EER calculations as it is in calculating efficiency in central cooling systems. By choosing an air conditioner with a high energy efficiency ratio you will be pleasantly surprised by the drop in your electricity bill. In fact, *Consumer Reports* found that a room air conditioner with an EER of 11 will cost 18 percent less to operate than one with an EER of 9!

**TABLE 2:
GREEN SEAL AIR CONDITIONER EFFICIENCY GUIDELINES**

TYPE	SIZE (BTU/HR)	EER
No Reverse Cycle	< 6,000	10.0
	6,000-7,999	10.0
	8,000-13,999	10.0
	14,000-19,999	10.5
	>=20,000	9.0
Reverse Cycle	All Sizes	9.5

Green Seal has developed recommendations for room air conditioner energy efficiency ratios. These recommendations can be found in Table 2 and any air conditioner recommended in this *Choose Green Report* meets or exceeds the efficiency level for its class. Choose a cooling unit which meets or exceeds these recommendations.

When faced with the challenge of achieving higher EERs some manufacturers increased their efficiency by using warmer and larger evaporators. This reduced the ability of the air conditioner to dehumidify the air efficiently. In effect, the highest efficiency air conditioners could actually use more energy than lower EER units because they have to run longer. **The Sensible Heat Ratio (SHR)** was developed to put a limit on the amount of energy a unit could use to cool the air. When cooling air two actions must be taken: the cooling of the air and the dehumidification of the air. The act of cooling the air is commonly referred to as the sensible effect. The act of dehumidifying the air is the latent effect and consumes much larger amounts of energy. The SHR is the ratio of the air conditioner's sensible cooling capacity to the sensible cooling plus the latent cooling capacity.

Green Seal recommends that the SHR on any unit not exceed 0.78 (78%); this limits the amount of energy the unit can use to achieve both cooling and dehumidification. SHR can be a significant issue for facilities that commonly have many PTACs operating in one building. However, since many manufacturers do not calculate the SHR for room air conditioners, it will be difficult for residential RAC users to find this information.

Refrigerant — In the past the most common refrigerant used in stationary air conditioners was an ozone depleting group of chemicals called Chlorofluorocarbons (CFCs). Currently another group of chemicals, Hydrochlorofluorocarbons (HCFCs), is used as the replacement for the former CFC refrigerants. HCFC-22, also known as R-22, is the most common refrigerant used in room air conditioners. It also has some ozone depleting effect but it is 1/20th that of its traditional CFC counterpart and is rated at an ozone depletion ratio of 0.05. HCFC-22 will be available in new equipment until 2010 and will be totally phased out by 2020. While HCFC-22 is the most common refrigerant on the market today, the future will bring less damaging options which should be chosen when available.

Reverse Cycle — Many consumers assume that air conditioners are simply cooling units. However, there is a section of the air conditioning market that manufactures units that utilize heat pumps to provide mild heating through a reverse cycle process. Because the process of absorbing heat from the air and transferring to the other side of the wall can simply be reversed, it can easily be seen why these units are referred to as reverse cycle. While these units are useful in temperate climates, their heating effect is limited and should not be used in areas that commonly endure sustained temperatures below 32°F. In some cases, manufacturers offer consumers

the option of electric heat to supplement. Units that are dedicated to cooling often have higher efficiencies than reverse cycle units. Therefore, a dedicated system should be chosen when

appropriate to environmental conditions. However, if a reverse cycle air conditioner is necessary be sure to purchase one with a high EER.

WHAT TO LOOK FOR IN AN AIR CONDITIONER

- A cooling capacity that is appropriate to the size and other conditions of the room to be cooled.
- An Energy Efficiency Ratio (EER) that meets or exceeds the Green Seal recommendations.
- A Sensible Heat Ratio (SHR) no greater than 0.78 (for PTACs or when available for RACs)

HOW MUCH ENERGY ARE YOU USING?

Use the equation below to calculate how much energy you are currently using— and how large your savings would be if you replaced your old air conditioner with a higher efficiency air conditioner.

$$\text{ANNUAL ENERGY USE} = \frac{\text{CAPACITY} \times \text{OPERATING TIME}}{\text{ENERGY EFFICIENCY RATIO}}$$

For example: A person running a room air conditioner in Orlando, Florida, has an average operating time of 1500 hours each year. If the air conditioner has a capacity of 15 kBtu/hour (15,000 Btu/hour) and an Energy Efficiency Ratio (EER) of 7 Btu/hour per Watt, then the equation would look like this:

$$\text{ANNUAL ENERGY USE} = \frac{15 \text{ kBtu/hour} \times 1500 \text{ hours}}{7 \text{ Btu/hour per Watt}} = 3214 \text{ kWh}$$

At an average charge of \$0.10 per kWh, the annual cost to run the air conditioner (for 1500 hours) would be \$322. If the same consumer upgraded to an air conditioner with an EER of 11, *annual energy use* would drop to 2045 kWh — and the annual cost to run the machine would drop to \$205, a savings of more than 36%!

Question: How much would you save if you bought a more efficient air conditioner?

Measurement terms: kWh = KiloWatt-hour; kBtu = Kilo British Thermal Unit

Recommended Room Air Conditioners

MANUFACTURER	PRODUCT NUMBER	TYPE	CAPACITY (BTU/h)	EER	NOTES
Amana	5M11TA	No Reverse Cycle	5,100	10.0	Voltage: 115V
Friedrich	SQ05J10	No Reverse Cycle	5,600	10.0	Voltage: 115V
GE	AMH06LA	No Reverse Cycle	5,800	10.0	
Friedrich	YQ06J10	Reverse Cycle	6,200	10.0	Voltage: 115V
Amana	7M11TA	No Reverse Cycle	6,600	10.0	Voltage: 115V
Friedrich	SQ06J10	No Reverse Cycle	6,600	10.0	Voltage: 115V
Friedrich	SQ07J10	No Reverse Cycle	7,100	10.3	Voltage: 115V
GE	AGH08FA	No Reverse Cycle	7,800	10.0	
Friedrich	SQ08J10A*	No Reverse Cycle	8,000	10.0	Voltage: 115V
Friedrich	SS08J10A	No Reverse Cycle	8,200	10.8	Voltage: 115V
Friedrich	YQ09J10	Reverse Cycle	9,000	11.5	Voltage: 115V
Amana	9M12TA	No Reverse Cycle	9,100	10.0	Voltage: 115V
Friedrich	SS09J10A	No Reverse Cycle	9,200	11.5	Voltage: 115V
Amana	10M12TA	No Reverse Cycle	10,000	10.0	Voltage: 115V
GE	AMH10AA	No Reverse Cycle	10,000	10.0	
Friedrich	SS10J10A	No Reverse Cycle	10,200	11.7	Voltage: 115V
GE	AMH12AC	No Reverse Cycle	11,500	10.0	
Amana	12M12TA	No Reverse Cycle	11,800	10.0	Voltage: 115V
Amana	12M22PA	No Reverse Cycle	11,800	10.0	Voltage: 230/208V
Friedrich	ES12J33	Reverse Cycle	12,000	10.5	Voltage: 230/208V
Friedrich	SS12J10A	No Reverse Cycle	12,000	10.5	Voltage: 115V
Amana	14M13TA	No Reverse Cycle	13,800	10.0	Voltage: 115V
GE	AGN14AA	No Reverse Cycle	13,800	10.0	
Frigidaire	FAV157W1A	No Reverse Cycle	15,000	10.5	
Amana	18M23TA	No Reverse Cycle	18,000	10.0	Voltage: 230/208V
Amana	21M23PA	No Reverse Cycle	21,000	9.2	Voltage: 230/208V
Friedrich	EL24J35	Reverse Cycle	24,000	12.0	Voltage: 230/208V
Friedrich	SL24J30	No Reverse Cycle	24,000	9.2	Voltage: 230/208V
Amana	24M33PA	No Reverse Cycle	25,000	9.2	Voltage: 230/208V
Friedrich	SL28J30	No Reverse Cycle	28,000	9.0	Voltage: 230/208V
Friedrich	SL33J30	No Reverse Cycle	33,000	9.0	Voltage: 230/208V

NOTE: The capacity and efficiency levels provided apply only to the cooling cycle. When the heating options are in use, the capacity and efficiency levels are slightly lower.

MANUFACTURER CONTACT INFORMATION

Amana	931-438-2136	Frigidaire	732-287-2000
GE	800-626-2000	Trane	931-645-6471
Friedrich	800-541-6645, ext. 201	Whalen	410-822-9200

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Recommended Packaged Terminal Air Conditioners

MANUFACTURER	PRODUCT NUMBER	TYPE	CAPACITY (BTU/h)	EER	SENSIBLE HEAT RATIO	NOTES
GE	AZ31H06E3C	Reverse Cycle	6,100	10.0	0.76	
GE	AZ21E06D3C	No Reverse Cycle	6,300	10.0	0.76	AC w/Electric Heat
GE	AZ26E06EBC (Also DBC)	No Reverse Cycle	6,300	10.0	0.78	AC w/Electric Heat
GE	AZ22E07E4P (Also 3P, 2P)	No Reverse Cycle	6,800	11.1	0.67	AC w/Electric Heat
Trane	PTEC	No Reverse Cycle	7,100	11.6	0.75	AC w/Electric Heat
Trane	PTHC	No Reverse Cycle	7,100	11.5	0.75	Heat Pump w/Electric Heat
GE	AZ22E09D3P (Also D2P)	No Reverse Cycle	8,600	10.8	0.57	AC w/Electric Heat
GE	AZ22E09E4P (Also 3P, 2P)	No Reverse Cycle	8,600	10.8	0.57	AC w/Electric Heat
Whalen	VI-**-301	Reverse Cycle	8,900	11.3	0.73	Water Source AC
Trane	PTHC	No Reverse Cycle	9,000	11.2	0.65	Heat Pump w/Electric Heat
Trane	PTEC	No Reverse Cycle	9,100	11.3	0.65	AC w/Electric Heat
Friedrich	TEC09K	No Reverse Cycle	9,200	11.0	0.77	Voltage: 230/208V
Friedrich	TEC09R	No Reverse Cycle	9,200	11.0	0.77	Voltage: 265V
Friedrich	THC09K	Reverse Cycle	9,200	11.0	0.77	Voltage: 230/208V
Friedrich	THC09R	Reverse Cycle	9,200	11.0	0.77	Voltage: 265V
GE	AZ22E12D3P (Also 2P)	No Reverse Cycle	11,200	10.2	0.54	AC w/Electric Heat
GE	AZ22E12E4P (Also 3P, 2P)	No Reverse Cycle	11,200	10.2	0.54	AC w/Electric Heat
Friedrich	TEC12K	No Reverse Cycle	11,700	10.0	0.76	Voltage: 230/208V
Friedrich	THC12K	Reverse Cycle	11,700	10.0	0.76	Voltage: 230/208V
Trane	PTEC	No Reverse Cycle	12,000	10.7	0.67	AC w/Electric Heat
Trane	PTHC	No Reverse Cycle	12,000	10.7	0.68	Heat Pump w/Electric Heat
Whalen	VI-**-401	Reverse Cycle	12,300	11.1	0.74	Water Source AC
Whalen	VI-**-601	Reverse Cycle	18,900	11.6	0.77	Water Source AC
Whalen	VI-**-801	Reverse Cycle	24,200	11.5	0.76	Water Source AC

NOTE: The capacity and efficiency levels provided apply only to the cooling cycle. When the heating options are in use, the capacity and efficiency levels are slightly lower.

MANUFACTURER CONTACT INFORMATION

Amana	931-438-2136	Frigidaire	732-287-2000
GE	800-626-2000	Trane	931-645-6471
Friedrich	800-541-6645, ext. 201	Whalen	410-822-9200

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- *Sizing up your cooling needs*



GREEN SEAL TEAMS UP WITH THE EARTH DAY NETWORK

Green Seal and the Earth Day Network have forged a partnership to encourage the procurement of energy-efficient products for their **Earth Day 2000 campaign**. Earth Day Network (EDN) is a worldwide alliance to promote a healthy environment and peaceful, just, sustainable world by organizing events, activities and annual campaigns. EDN's Earth Day 2000 clean energy campaign will spark a rapid transition from outdated polluting fossil fuels and nuclear energy to clean, safe, renewable energy sources like solar and wind power. For more information see the EDN website at **www.earthday.net**



COMPREHENSIVE PROCUREMENT GUIDELINES SUMMARY

The Comprehensive Procurement Guideline (CPG) program is part of EPA's continuing effort to promote the use of materials recovered from solid waste. Buying recycled-content products ensures that the materials collected in recycling programs will be used again in the manufacture of new products. The program is authorized by Congress under Section 6002 of the Resource Conservation and Recovery Act (RCRA) and Executive Order 13101. Under this legislation EPA is required to designate products that are, or can be, made with recovered materials.

Once a product is designated, procuring agencies are required to purchase it with the highest recovered material content level practicable. EPA issues guidance on buying recycled-content products in *Recovered Materials Advisory Notices* (RMANs). The RMANs recommend recycled content ranges for CPG products based on current information on commercially available products.

RMAN levels are updated as marketplace conditions change. A complete list of CPG products appears below and the Contract Language section reflects the CPG where applicable.

For more information, please visit EPA web site at <http://www.epa.gov/cpg/>

Construction Products

Building insulation products
Carpet
Carpet cushion
Cement and concrete containing:
-coal fly ash
-ground granulated blast furnace slag
Consolidated and reprocessed latex paint
Floor tiles
Flowable fill
Laminated paperboard
Patio blocks
Railroad grade crossing surfaces
Shower and restroom dividers/partitions
Structural fiberboard

Landscaping Products

Garden and soaker hoses
Hydraulic mulch
Plastic lumber landscaping timbers and posts
Lawn and garden edging
Compost made from yard trimmings or food waste

Non-paper Office Products

Binders, clipboards, file folders, clip portfolios, and presentation folders
Office recycling containers
Office waste receptacles
Plastic desktop accessories
Plastic envelopes
Plastic trash bags
Printer ribbons
Toner cartridges

Paper and Paper Products

Commercial/industrial sanitary tissue products
Miscellaneous papers
Newsprint
Paperboard and packaging products
Printing and writing papers

Park and Recreation Products

Park benches and picnic tables
Plastic fencing
Playground equipment
Playground surfaces
Running tracks

Transportation Products

Channelizers
Delineators
Flexible delineators
Parking stops
Traffic barricades
Traffic cones

Vehicular Products

Engine coolants
Re-refined lubricating oils
Retread tires

Miscellaneous Products

Awards and plaques
Industrial drums
Mats
Pallets
Signage
Sorbents
Manual-grade strapping

ENERGY STAR CATEGORIES

With current energy concerns, state local, and Federal governments are faced with increasingly higher utility bills to operate their buildings. Energy Star products use 25 to 50 percent less energy than their traditional counterparts, reduce fossil fuel use, and lower greenhouse gas emissions. Energy Star makes it easy to purchase energy-efficient products, reduce their energy costs, and prevent air pollution.

Governments could save over \$139 million annually on energy bills if they purchased and used Energy Star labeled products. The energy saved could light more than 18 million homes per year.

A list of Energy Star products appears below, along with products that have efficiency guidelines from the Federal Energy Management Program (FEMP) and the Department of Energy. In addition, Green Seal's *Choose Green Reports* and contract language reflect Energy Star efficiency levels where appropriate.

Office Equipment

Computers

Monitors

Printers

Fax Machines

Copiers

Scanners

Multifunction Devices

Residential Lighting

Compact Fluorescent Light Bulbs (CFLs)

Floor and Table Lamps

Outdoor Lights

Chandeliers and Suspended Lights

Cabinet Lighting

Ceiling-Mounted and Track Lighting

Ceiling Fans with Lighting

Sconces and Wall-Mounted Lights

Recessed or "High Hat" Lights

Architectural

Commercial Lighting

Compact Fluorescent Light Bulbs (CFLs)

Exit Signs

Fluorescent Tube Lamps (FEMP)

Fluorescent Ballasts (FEMP)

Industrial HID Luminaires (FEMP)

Downlight Luminaires (FEMP)
Fluorescent Luminaires (FEMP)
Lighting Controls (FEMP)

Residential Appliances

Dishwashers
Refrigerators
Dehumidifiers
Clothes Washers
Water Coolers
Clothes Dryers (DOE)
Ovens, Ranges (DOE)

Commercial Appliances

Refrigerators and Freezers
Water Coolers
Ice Cube Machines (FEMP)
Clothes Washers (FEMP)
Gas Fryers (FEMP)
Gas Griddles (FEMP)
Hot Food Holding Cabinets (FEMP)
Pressureless Steamers (FEMP)

Residential HVAC Equipment

Central Air Conditioners
Room Air Conditioners
Boilers
Programmable Thermostats
Gas Furnaces
Air Source Heat Pumps
Ground Source Heat Pumps
Ventilating Fans
Ceiling Fans
Electric Water Heaters (FEMP)
Gas Water Heaters (FEMP)

Commercial HVAC Equipment

Unitary Air Conditioners
Heat Pumps
Ground Source Heat Pumps
Boilers (FEMP)
Air-Cooled Electric Chillers (FEMP)
Water-Cooled Electric Chillers (FEMP)

Residential Construction Products

Windows

Roof Products

Commercial Roof Products

Roof Products

Consumer Electronics

Televisions

VCRs

TV/VCR Combination Units

DVD Products

Home Audio

Set-top Boxes

Cordless Phones

Answering Machines

Cordless Phone/Answering Machine Combination Units

Commercial and Industrial Technologies

Distribution Transformers

Traffic Signals

Motors (FEMP)

Centrifugal Pumping Systems (FEMP)

CONTRACT LANGUAGE FOR THE PURCHASE OF ENVIRONMENTALLY PREFERABLE PRODUCTS

- Bathroom cleaners
- Carpet
- Commercial Adhesives
- Copy paper
- General purpose industrial and institutional cleaners
- Glass cleaners
- Paints
- Paper towels
- Particle and fiberboard
- Printing paper
- Rigid fast food packaging

Bathroom Cleaners (Please see General Purpose Industrial & Institutional Cleaners)

Carpet

The following environmental specifications shall be met in addition to other performance specifications articulated elsewhere:

1. The carpet shall be either refurbished carpet OR carpet with recycled content OR carpet from natural fibers.
2. The carpet must meet the Carpet and Rug Institute's Indoor Air Quality Carpet Testing Green Label.
3. Adhesives used with the carpet must contain a maximum of 150 g/l VOCs and comply with the Carpet and Rug Institute's Indoor Air Quality Carpet Testing Green Label.
4. The carpet shall be offered under a leasing program OR manufacturer must offer a take-back and recycling option OR the carpet shall be acceptable for current recycling programs.
5. Refurbished carpet shall be made of used carpet that has been cleaned, dyed, and restored to "like new" condition. Refurbished carpet shall have at least a 10-year warranty.
6. For recycled content carpet, polyester face fiber carpet shall contain a minimum of 25% post-consumer material and nylon face fiber carpet shall contain a minimum of 25% post-consumer materials. For both polyester and nylon face fiber, the carpet backing shall contain 100% recovered materials, with a minimum 35% post-consumer content. Recycled content carpet shall have a warranty of at least 15 years.
7. Natural fiber carpet shall have a warranty of at least 15 years.

Commercial Adhesives

The following environmental specifications shall be met in addition to other performance specifications articulated elsewhere:

All bidders must submit a letter of attestation verifying that the product offered is in accordance with and meets the minimum requirements of the Green Seal Environmental Standard for Commercial Adhesives, GS-36, October 19, 2000 (First Edition) (see standard following).

Copy Paper

The following environmental specifications shall be met in addition to other performance specifications articulated elsewhere:

1. The product shall contain at least 30 percent post-consumer materials. Post-consumer materials are those which have served their intended end uses and have been diverted from the waste stream.
2. No chlorine or chlorine derivatives (such as chlorine dioxide) shall be used if bleaching is employed in processing the product or its feedstock materials. This provision does not apply to bleaching in the original manufacture of recovered materials.

General Purpose Industrial and Institutional Cleaners, Bathroom Cleaners, and Glass Cleaners

The following environmental specifications shall be met in addition to other performance specifications articulated elsewhere:

All bidders must submit a letter of attestation verifying that the product offered is in accordance with and meets the minimum requirements of the Green Seal Environmental Standard for General-Purpose, Bathroom, and Class Cleaners Used for Industrial and Institutional Purposes, GS-37, October 2, 2000 (First Edition) (see standard following).

Glass Cleaners

(Please see General Purpose Industrial & Institutional Cleaners.)

Paints

The following environmental specifications shall be met in addition to other performance specifications articulated elsewhere:

1. The paint shall be either newly manufactured paint OR reprocessed paint OR consolidated paint. Reprocessed paint is post-consumer latex paint that has been sorted by a variety of characteristics including type (i.e., interior or exterior), light and dark colors, and finish (e.g., high-gloss versus flat). Reprocessed paint is available in various colors and is suitable for both interior and exterior applications.

Consolidated paint consists of post-consumer latex paint with similar characteristics (e.g., type, color family, and finish) that is consolidated at the point of collection. Consolidated paint is typically used for exterior applications or as an undercoat. Post-consumer materials are those which have served their intended end uses and have been diverted from the waste stream.

2. For new paints, all bidders must submit a letter of attestation from the bidder's laboratory or an independent laboratory verifying that the product offered is in accordance with and meets the minimum requirements of the Green Seal Environmental Standard for Paints, GS-11, May 20, 1993 (First Edition) (see standard following).
3. For reprocessed latex paint, White, Off-White, and Pastel Colors shall contain a minimum of 20 percent post-consumer paint. Grey, Brown, Earthtones, and Other Dark Colors shall contain a minimum of 50 percent post-consumer latex paint.
4. For consolidated latex paint, all colors must contain 100 percent post-consumer latex paint.

Paper Towels

The following environmental specifications shall be met in addition to other performance specifications articulated elsewhere:

1. The product shall contain at least 40 percent post-consumer materials. Post-consumer materials are those which have served their intended end uses and have been diverted from the waste stream.
2. The product and its feedstock materials shall not be bleached or, if bleached, no chlorine or chlorine derivatives (such as chlorine dioxide) shall be used. This provision does not apply to bleaching in the original manufacture of recovered materials.
3. The product shall contain no fragrances or perfumes.
4. If rolled, the product shall be mounted on a hard roll in large or jumbo size (in terms of sheets per roll).
5. Any packaging used in shipping the product should contain material that is recycled and recyclable and should be the minimum required for transport.

Particleboard and Medium-density Fiberboard

The following environmental specifications shall be met in addition to other performance specifications articulated elsewhere:

1. The product shall contain at least 80 percent post-consumer waste fiber OR at least 80 percent agricultural waste fiber OR at least 80 percent recovered wood fiber. Post-consumer materials are those which have served their intended end uses and have been diverted from the waste stream. Recovered materials are those waste materials and byproducts that have been recovered or diverted from solid-waste streams. Recovered material does not include materials and byproducts generated from, and commonly reused within, an original manufacturing process.
2. The binding resin shall not contain formaldehyde.

Printing Paper

The following environmental specifications shall be met in addition to other performance specifications articulated elsewhere:

1. The product shall contain at least 30 percent post-consumer materials. Post-consumer materials are those which have served their intended end uses and have been diverted from the waste stream.
2. No chlorine or chlorine derivatives (such as chlorine dioxide) shall be used if bleaching is employed in processing the product or its feedstock materials. This provision does not apply to bleaching in the original manufacture of recovered materials.

Rigid Fast Food Packaging (Hinged Containers and Two-Part Containers)

The following environmental specifications shall be met in addition to other performance specifications articulated elsewhere:

All bidders must submit a letter of attestation verifying that the product offered is in accordance with and meets the minimum requirements of the Green Seal Environmental Standard for Food-Service Packaging, Part A: Rigid Containers, GS-35, March 15, 2000 (First Edition) (see standard following).

Commercial Adhesives (GS-36)

October 19, 2000

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1. Scope

This Environmental Standard establishes environmental requirements for:

- a. Adhesives, adhesives applied onto substrates, and aerosol adhesives. Adhesives covered by the standard shall be intended and labeled for use as a commercial adhesive. The subcategories of adhesives included in this Standard are:
 - i. Acrylonitrile-Butadiene-Styrene (ABS) Welding Adhesive is any adhesive intended by the manufacturer to weld acrylonitrile-butadiene-styrene (ABS) pipe.
 - ii. Aerosol Adhesive is a mixture of rubber, resins, and liquid and gaseous solvents and propellants packaged in a container for hand-held application.
 - iii. Carpet Pad Installation Adhesive is any adhesive intended by the manufacturer for the installation on a floor or comparable surface of carpet pad (or cushion), which is used beneath a carpet.
 - iv. Ceramic Tile Installation Adhesive is any adhesive intended by the manufacturer for the installation of ceramic tiles.
 - v. Chlorinated Polyvinyl Chloride (CPVC) Welding Adhesive is any adhesive intended by the manufacturer for the welding of CPVC plastic pipe.
 - vi. Contact Bond Adhesive is any adhesive intended by the manufacturer to adhere to itself instantaneously upon contact. The adhesive is applied to both adherends and allowed to become dry, which develops a bond when the adherends are brought together without sustained pressure.
 - vii. Contact Bond Adhesive-Special Substrates is any contact adhesive that is intended by the manufacturer to be used for the bonding of nonporous substrates to each other, the bonding of decorative laminate in postforming application, or for the bonding of decorative laminate to metal, melamine-covered board, or curved surfaces, or when used to bond any substrate to metal, rubber, rigid plastic, or wood veneer not exceeding 1/16" in thickness.
 - viii. Cove Base Installation Adhesive is any adhesive intended by the manufacturer for the installation of cove base (or wall base), which is generally made of vinyl or rubber, on a wall or vertical surface at floor level.
 - ix. Indoor Floor Covering Installation Adhesive is any adhesive intended by the manufacturer for the installation of carpet, resilient tile, vinyl tile, vinyl backed carpet, resilient sheet and roll, or artificial grass that is in an enclosure and is not exposed to ambient weather conditions during normal use. Ceramic tile installation and the installation of perimeter bonded sheet flooring with vinyl backing onto a non-porous substrate, such as flexible vinyl are excluded from this category.
 - x. Multipurpose Construction Adhesive is any adhesive intended by the manufacturer for the installation or repair of various construction

materials, including but not limited to drywall, subfloor, panel, fiberglass reinforced plastic (FRP), plywood, pre-decorated hardboard (or tileboard), and similar pre-decorated or non-decorated panels, ceiling tile, and acoustical tile to studs or solid surfaces.

- xi. Nonmembrane Roof Installation/Repair Adhesive is any adhesive intended by the manufacturer for the installation or repair of nonmembrane roofs and that is not intended for the installation of prefabricated single-ply flexible roofing membrane. This category includes plastic or asphalt roof cement, asphalt roof coatings, and cold application cement.
- xii. Outdoor Floor Covering Installation Adhesive is any adhesive intended by the manufacturer for the installation of floor covering that is not in an enclosure and is exposed to ambient weather conditions during normal use.
- xiii. Perimeter Bonded Sheet Flooring Installation Adhesive is any adhesive intended by the manufacturer for the installation of sheet flooring with vinyl backing onto a nonporous substrate using an adhesive design to be applied only to a strip of up to four inches wide around the perimeter of the sheet flooring.
- xiv. Polyvinyl Chloride (PVC) Welding Adhesive is any adhesive intended by the manufacturer for the welding of PVC plastic pipe.
- xv. Single-Ply Roof Membrane Installation/Repair Adhesive is any adhesive intended by the manufacturer for the installation or repair of single-ply roof membrane. Installation includes, as a minimum, attaching the edge of the membrane to the edge of the roof and applying flashings to vents, pipes, and ducts that protrude through the membrane. Repair includes gluing the edges of tears together, attaching a patch over a hole, and reapplying flashings to vents, pipes, or ducts installed through the membrane.
- xvi. Structural Glazing Adhesive is any adhesive intended by the manufacturer to adhere glass, ceramic, metal, stone, or composite panels to exterior building frames.
- xvii. Waterproof Resorcinol Glue is a two-part resorcinol-resin-based adhesive designed for applications where the bond line must be resistant to conditions of continuous immersion in fresh or salt water.
- xviii. Wood Flooring Adhesive is any adhesive intended by the manufacturer for the installation of wood flooring that is in an enclosure and is not exposed to ambient weather conditions during normal use.

- b. Adhesives specifically excluded from this Standard. The Standard specifically does not cover adhesive tapes or tape strips, textile adhesives, optical adhesives, adhesives used with electronics, packaging adhesives, or aerospace adhesives.

2. Definitions

For the purpose of this Standard, the following definitions apply:

- a. Adhesive: A substance capable of holding materials together by surface attachment.
- b. Carcinogens: Chemicals classified by the International Agency for Research on Cancer (IARC) as Group I (carcinogenic to humans), Group 2A (probably carcinogenic to humans), or Group 2B (possibly carcinogenic to humans) agents, with the exception of crystalline silica.

- c. Commercial Adhesive: An adhesive product that is designed for use in the maintenance or operation of an establishment that manufactures, transports, or sells goods or commodities, or provides services for profit; or is engaged in the nonprofit promotion of a particular public, educational, or charitable cause. Establishments include, but are not limited to, government agencies, military organizations, factories, schools, hospitals, sanitariums, prisons, libraries, office complexes, restaurants, hotels, stores, automobile service and parts centers, health clubs, theaters, or transportation companies. Commercial Adhesives do not include products that are incorporated into or used exclusively in the manufacture or construction of the goods or commodities that are produced by the establishment.
- d. Ozone-Depleting Substances (ODSs): An ozone-depleting substance is any compound with an ozone depletion potential greater than 0.01 (CFC 11=1), as determined by the United States Environmental Protection Agency.
- e. Persistent, Bioaccumulative, and Toxic Compounds (PBTs): Compounds identified by the U.S. Environmental Protection Agency Waste Minimization Branch as being persistent, bioaccumulative, and toxic.
- f. Plastic Cement Welding: The use of adhesives made of resins and solvents which are used to dissolve the surfaces of plastic, except ABS, CPVC, and PVC plastic, to form a bond between mating surfaces.
- g. Plastic Foam: A foam constructed of plastics.
- h. Porous Material: A substance which has tiny openings, often microscopic, in which fluids may be absorbed or discharged (e.g., wood).
- i. Reproductive Toxins: Chemicals known to cause reproductive toxicity as listed by the State of California under the Safe Drinking Water and Toxic Enforcement Act of 1986 (California Code of Regulations, Title 22, Division 2, Subdivision 1, Chapter 3, Sections 1200, et seq.).
- j. Volatile Organic Compounds (VOCs): Compounds as defined by the United States Environmental Protection Agency (EPA) in 40 CFR § 51.100 (s) (1).

3. Product Specific Performance Requirements

Product shall be approved by the manufacturer for use as an adhesive type outlined in Section 1.

4. Product Specific Health and Environmental Requirements

- a. Carcinogens
The product shall not be formulated with any carcinogens. Any carcinogen that is known to be present as a contaminant shall not exceed 0.1% by weight of the product.
- b. Reproductive Toxins
The product shall not be formulated with any reproductive toxins. Any reproductive toxin that is known to be present as a contaminant shall not exceed 0.1% by weight of the product.

- c. Persistent, Bioaccumulative, and Toxic Compounds (PBTs)
The product shall not be formulated with any persistent, bioaccumulative, and toxic compounds (PBTs). Any PBT that is known to be present as a contaminant shall not exceed 0.1% by weight of the product.
- d. Ozone-Depleting Substances (ODSs)
The product shall not be formulated with any ozone-depleting substances. Any ozone-depleting substance that is known to be present as a contaminant shall not exceed 0.1% by weight of the product.
- e. Volatile Organic Compounds

Adhesive Type	VOC weight in grams/liter minus water
ABS Welding	400
Carpet Pad Installation	150
Ceramic Tile Installation	130
Contact Bond	250
Contact Bond-Specialty Substrates	400
Cove Base Installation	150
CPVC Welding	490
Indoor Floor Covering Installation	150
Multipurpose Construction	200
Nonmembrane Roof Installation/Repair	300
Other Plastic Cement Welding	510
Outdoor Floor Covering Installation	250
PVC Welding	510
Rubber Floor Installation	150
Single-Ply Roof Membrane Installation/Repair	250
Structural Glazing	100
Perimeter Bonded Sheet Vinyl Flooring Installation	660
Waterproof Resorcinol Glue	170
Wood Flooring Adhesive	150

- f. Volatile Organic Compounds (continued)
For adhesives not listed above and applied to the following substrates, the following limits shall apply:

Adhesives Application Onto Substrate	VOC weight in grams/liter minus water
Flexible vinyl	250
Fiberglass	200
Metal-to-Metal	30
Porous material	120
Plastic Foams	120
Rubber	250
Other substrates	250

Aerosol Adhesives:	VOC weight in grams/liter minus water
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General purpose mist spray	65% VOCs by weight
General purpose web spray	55% VOCs by weight
Special purpose aerosol adhesives (all types)	70% VOCs by weight

g. Toxic Compounds

The solvent portion of the adhesive shall not be toxic to humans when inhaled. A product is considered toxic if the following lethal dose (LD) criterion applies:

Inhalation LC50 < 2,000 ppm of vapor or gas or 20 mg/L of mist, dust, or fumes

The toxicity testing procedures shall follow the protocols put forth in the Organization for Economic Cooperation and Development (OECD) Guidelines for the Testing of Chemicals, which includes: Acute Inhalation Toxicity Test (TG 403). To demonstrate compliance with this requirement, a solvent need not be tested if existing toxicological information demonstrates that it complies. Data from the Registry of Toxic Effects of Chemical Substances (RTECS) and from the Hazardous Substances Data Bank (HSDB) will be accepted as well as peer-reviewed primary data.

h. Packaging

Product packaging shall be resealable after the first use except for single-use packaging. Shipping packaging shall be reusable, recyclable or reconditionable. Corrugated shipping packaging shall contain 30% minimum postconsumer recycled content.

5. Labeling Requirements

Unless otherwise approved in writing by Green Seal the following labeling requirements shall apply.

- a. The Green Seal Certification Mark may appear on the product and the product packaging.
- b. Wherever the Green Seal Certification Mark appears, it shall be accompanied by a description of the basis for certification. This description shall be in a location, style, and typeface that are easily readable by purchasers. At a minimum, the description shall read as follows:

"This product meets Green Seal's Environmental Standard for commercial adhesives based on its reduced hazard to humans, reduced volatile organic compounds, and reduced hazardous ingredients."

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Industrial and Institutional Cleaners (GS-37)

October 19, 2000

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1. Scope

This standard establishes environmental requirements for industrial and institutional general-purpose, bathroom, and glass cleaners. For purposes of this standard, general-purpose, bathroom, and glass cleaners are defined as those cleaners intended for routine cleaning of offices, institutions, warehouses, and industrial facilities. The standard does not focus on the use of cleaners in households, food preparation operations, or medical facilities.

Due to the large number of possible cleaning products, processes, soil types, and cleaning requirements, the compatibility of cleaners with surface materials is not specifically addressed in this standard. Product users should follow the manufacturers' instructions on compatibility.

Each criterion states whether it applies to the undiluted product or to the product as used.

2. Definitions:

Bathroom cleaners. This category includes products used to clean hard surfaces in a bathroom such as counters, walls, floors, fixtures, basins, tubs, and tile. It includes products that are required to be registered under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), such as disinfectants and sanitizers, but does not include products specifically intended to clean toilet bowls.

Concentrate. This is a product that must be diluted by at least eight parts by volume water (1:8 dilution ratio) prior to its intended use.

Dispensing-system concentrates. These are products that are designed to be used in dispensing systems that cannot be practically accessed by users.

General-purpose cleaners. This category includes products used for routine cleaning of hard surfaces including impervious flooring such as concrete or tile. It does not include cleaners intended primarily for the removal of rust, mineral deposits, or odors. It does not include products intended primarily to strip, polish, or wax floors, and it does not include cleaners intended primarily for cleaning toilet bowls, dishes, laundry, glass, carpets, upholstery, wood, or polished surfaces. This category does not include any products required to be registered under FIFRA, such as those making claims as sterilizers, disinfectants, or sanitizers.

Glass cleaners. This category includes products used to clean windows, glass, and polished surfaces. This category does not include any products required to be registered under FIFRA, such as those making claims as sterilizers, disinfectants, or sanitizers.

Ingredient. Any constituent of a product that is intentionally added or known to be a contaminant that comprises at least 0.01% by weight of the product.

Ozone-depleting compounds. An ozone-depleting compound is any compound with an ozone-depletion potential greater than 0.01 (CFC 11 = 1).

Product as used. This is the most concentrated form of the product that the manufacturer recommends for a product's intended use. For example, if a manufacturer recommends a product be diluted 1:64 or 2:64 for use as a general-purpose cleaner, the product shall meet the environmental and performance requirements at a dilution of 2:64.

Primary packaging. This packaging is the material physically containing and coming into contact with the product, not including the cap or lid of a bottle.

Recyclable package. This package can be diverted from the waste stream through available processes and programs, and can be collected, processed, and returned to use in the form of raw materials or products.

Undiluted product. This is the most concentrated form of the product produced by the manufacturer for transport outside its facility.

3. Product-Specific Performance Requirements

Each product *as used* when diluted with water from the cold tap at no more than 50 °F, shall clean common soils and surfaces in its category effectively, as measured by a standard test method. Green Seal recommends the following test methods:

General-purpose cleaners. The product shall remove at least 80% of the particulate soil in the American Society for Testing and Materials (ASTM) D4488-95, A5.

Bathroom cleaners. The product shall remove at least 75% of the soil in ASTM D5343 as measured by ASTM D5343.

Glass cleaners. The product shall achieve at least a rating of three in each of the following Chemical Specialties Manufacturers Association (CSMA) DCC 09 categories: soil removal, smearing, and streaking.

Using standard test methods, a manufacturer can also demonstrate that its product performs as well as a nationally recognized product in its category or achieves the removal efficiency defined in this section.

4. Product-Specific Health and Environmental Requirements

4.1 Toxic Compounds

The *undiluted* product shall not be toxic to humans. Dispensing-system concentrates shall be tested as used. A product is considered toxic if any of the following criteria apply:

Oral lethal dose 50 (LD50)	<2,000 mg/kg
Inhalation lethal concentration (LC50)	<20 mg/L *

* If the vapor-phase concentration of the product at room temperature is less than 20 mg/L, it should be tested at its saturation concentration. If it is not toxic at this concentration, it passes the inhalation criterion.

Toxicity shall be measured on the product as a whole. Alternatively, a mixture need not be tested if existing toxicity information demonstrates that each of the ingredients complies. Ingredients that are nonvolatile do not require inhalation toxicity testing, and ingredients that are not readily absorbed through the skin do not require dermal toxicity testing (Appendix A). It is assumed that the toxicity of the individual component compounds are weighted and summed and that there are not synergistic effects (Appendix A).

The toxicity testing procedures should meet the requirements put forth by the Organization for Economic Cooperation and Development (OECD) Guidelines for Testing of Chemicals. These protocols include Acute Oral Toxicity Test (TG 401), Acute Inhalation Toxicity Test (TG 403), and Acute Dermal Toxicity Test (TG 402).

4.2 Carcinogens and Reproductive Toxins

The *undiluted* product shall not contain any ingredients that are carcinogens or that are known to cause reproductive toxicity. Carcinogens are defined as those chemicals listed as known, probable, or possible human carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP), the U.S. Environmental Protection Agency, or the Occupational Health and Safety Administration. Chemicals known to cause reproductive toxicity are defined as those listed by the State of California under the Safe Drinking Water and Toxic Enforcement Act of 1986 (California Code of Regulations, Title 22, Division 2, Subdivision 1, Chapter 3, Sections 1200, *et seq.*).

Naturally occurring elements and chlorinated organics, which may be present as a result of chlorination of the water supply, are not considered ingredients if the concentrations are below the applicable maximum contaminant levels in the National Primary Drinking Water Standards found in 40 Code of Federal Regulations (CFR) Part 141.

4.3 Skin and Eye Irritation

The *undiluted* product shall not be corrosive to the skin or eyes. Dispensing-system concentrates shall be tested as used. The undiluted cleaning product shall not be corrosive to the skin, as tested using the Human Skin Construct systems (Liebsch et al. 2000; Fentem et al. 1998). The undiluted cleaning product shall also not be corrosive to the eye as tested using the bovine opacity and permeability test (BCOP) (Sina et al. 1995) after a 10-minute exposure. Green Seal will also accept the results of other peer-reviewed or standard in vitro or in vivo test methods demonstrating that the product mixture is not corrosive.

4.4 Skin Sensitization

The *undiluted* product shall not be a skin sensitizer, as tested by the OECD Guidelines for Testing Chemicals, Section 406. Dispensing-system concentrates shall be tested as used. Green Seal shall also accept the results of other standard test methods, such as those described in Buehler (1994) or Magnusson and Kligman (1969), as proof that the product or its ingredients are not skin sensitizers.

4.5 Combustibility

The *undiluted* product shall not be combustible. The product or 99% by volume of the product ingredients shall have a flashpoint above 150 °F, as tested using either the Cleveland Open Cup Tester (ASTM D92-97) or a closed-cup method International Standards Organization (ISO) 13736 or ISO 2719. Alternatively, the product shall not sustain a flame when tested using ASTM D 4206.

4.6 Photochemical Smog, Tropospheric Ozone Production, and Indoor Air Quality

The product as used shall not contain substances that contribute significantly to the production of photochemical smog, tropospheric ozone, or poor indoor-air quality. The volatile organic content of the product as used shall not exceed the following:

- 1% by weight for general-purpose and bathroom cleaners
- 3% by weight for glass cleaners

The volatile organic content shall be determined by California Air Resources Board Method 310.

4.7 Toxicity to Aquatic Life

The product as used shall not be toxic to aquatic life. A compound is considered not toxic to aquatic life if it meets one or more of the following criteria:

Acute LC₅₀ for algae, daphnia, or fish < 100 mg/L

For purposes of demonstrating compliance with this requirement, aquatic toxicity testing is not required if sufficient aquatic toxicity data exist for each of the product's ingredients to demonstrate that the product mixture complies. Aquatic toxicity tests shall follow the appropriate protocols in ISO 7346.2 for fish and in 40 CFR 797, Subpart B for other aquatic organisms.

4.8 Aquatic Biodegradability

Each of the organic ingredients shall exhibit ready biodegradability in accordance with the OECD definition except for a FIFRA-registered ingredient in a bathroom cleaner. However, all other ingredients in a FIFRA-registered bathroom cleaner must comply. Biodegradability shall be measured by one of the following methods: ISO 9439 carbon dioxide (CO₂) evolution test, ISO 10708 (two-phase closed-bottle test), ISO 10707 (closed bottle test), or ISO 7827 (dissolved organic carbon removal). Specifically, within a 28-day test, the ingredient shall meet one of the following criteria within 10 days of the time when biodegradation first reaches 10%:

Removal of dissolved organic carbon (DOC)	>70%
Biological oxygen demand (BOD)	>60%
% of BOD of theoretical oxygen demand (ThOD)	>60%
% CO ₂ evolution of theoretical	>60%

For organic ingredients that do not exhibit ready biodegradability in these tests, the manufacturer may demonstrate biodegradability in sewage treatment plants using the Coupled Units Test found in OECD 303A by demonstrating dissolved organic carbon (DOC) removal >90%.

Testing is not required for any ingredient for which sufficient information exists concerning its biodegradability, either in peer-reviewed literature or databases or proving that the ingredient was tested in accordance with standard test procedures.

4.9 Eutrophication

The product *as used* shall not contain more than 0.5% by weight of total phosphorus.

4.10 Packaging

The primary package shall be recyclable. Alternatively, manufacturers may provide for returning and refilling of their packages.

4.11 Concentrates

The product must be a concentrate, except for FIFRA-registered bathroom cleaners.

4.12 Fragrances

Manufacturers shall identify any fragrances on their material safety data sheets (MSDSs). Any ingredient added to a product as a fragrance must follow the Code of Practice of the International Fragrance Association.

4.13 Prohibited Ingredients

The product shall not contain the following ingredients:

- Alkylphenol ethoxylates
- Dibutyl phthalate
- Heavy metals including arsenic, lead, cadmium, cobalt, chromium, mercury, nickel, or selenium
- Ozone-depleting compounds

4.14 Training

The product manufacturer, its distributor, or a third party shall offer training or training materials in the proper use of the product. These shall include step-by-step instructions for the proper dilution, use, disposal, and the use of equipment. Manufacturers shall have product labeling systems to assist non-English-speaking or illiterate personnel.

4.15 Animal Testing

This section applies to Sections 4.1, 4.3, and 4.7. Green Seal wants to discourage animal testing and will accept the results of past peer-reviewed or standard tests demonstrating compliance with a criterion. A mixture

need not be tested if existing information demonstrates that each of the ingredients complies with a criterion. Additionally, Green Seal may accept non-animal (in-vitro) test results, providing that the test methods are referenced in peer-reviewed literature and the manufacturer provides the reasons for selecting the particular test method.

5. Labeling Requirements

The manufacturer's label shall state clearly and prominently that dilution with water from the cold tap is recommended and shall state the recommended level of dilution. The manufacturer shall also include detailed instructions for proper use and disposal and for the use of personal protective equipment.

Whenever the Green Seal certification mark appears on a package, the package shall contain a description of the basis for certification. The description shall be in a location, style, and typeface that are easily readable. Unless otherwise approved in writing by Green Seal, the description shall read as follows:

"This product meets Green Seal's environmental standard for industrial and institutional cleaners based on its reduced human and aquatic toxicity and reduced smog production potential."

For FIFRA-registered bathroom cleaners, replace "toxicity" with the word "impacts".

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Paints (GS-11)

First Edition May 20, 1993

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1. Scope

This Standard establishes environmental requirements for paints. The standard does not include stains, clear finishes, or paints sold in aerosol cans.

2. Definitions.

For the purpose of this Standard, the following definitions apply.

2.1 Paints: Liquid, liquefiable or mastic composition that is converted to a solid protective, decorative, or functional adherent film after application as a thin layer. These coatings are intended for on-site application to interior or exterior surfaces of residential, commercial, institutional or industrial buildings.¹

2.2 Volatile Organic Compounds (VOCs): Compounds as defined by U. S. Environmental Protection Agency (EPA) in 40 CFR § 51.100 (s), (s) (1).

2.3 Aromatic Compounds: Hydrocarbon compounds containing one or more 6-carbon benzene rings in the molecular structure.

3. Product-Specific Performance Requirements.

3.1 Interior Topcoats. Products intended for interior opaque topcoat use shall meet the following requirements.

3.1.1 Scrubbability (Abrasion Resistance). The product shall demonstrate at least 100 cycles (200 separate strokes) before failure, as determined by American Society for Testing and Materials (ASTM) D2486-89, *Standard Test Method for Scrub Resistance of Interior Latex Flat Wall Paints*.

3.1.2 Hiding Power (Opacity). The product shall demonstrate a minimum 0.95 contrast ratio at 400 square feet per gallon as determined by ASTM D2805-88, *Standard Test Method for Hiding Power of Paints by Reflectometry*. Compliance will be determined by testing a white paint having a minimum 80% reflectance.

3.1.3 Washability (Stain Removal). The product shall demonstrate the following minimum requirements for stain removal as determined by ASTM 4828-91 Mechanical Method, *Standard Test Method for Practical Washability of Organic Coatings*.

Flat² 5 minimum rating

Non-Flat 7 minimum rating

3.2 Exterior Topcoats. Products intended for exterior opaque topcoat use shall meet the following requirements.

3.2.1 Hiding Power (Opacity). The product shall demonstrate a minimum 0.95 contrast ratio at 400 square feet per gallon as determined by ASTM D2805-88, *Standard Test Method for Hiding Power of Paints by Reflectometry*. Compliance will be determined by testing a white paint having a minimum 80% reflectance.

4. Product-Specific Environmental Requirements.

4.1 Chemical Component Limitations.

4.1.1 VOCs. The VOC concentrations of the product shall not exceed those listed below as determined by U. S. Environmental Protection Agency (EPA) Reference Test Method 24 (Determination of Volatile Matter Content, Water Content, Density Volume Solids, and Weight Solids of Surface Coatings), Code of Federal Regulations Title 40, Part 60, Appendix A.

The calculation of VOC shall exclude water and tinting color added at the point of sale.

Interior Coatings:

<u>Coating Type</u>	<u>VOC weight in grams/liter of product minus water</u>
Non-flat ³	150
Flat	50

Exterior Coatings:

<u>Coating Type</u>	<u>VOC weight in grams/liter of product minus water</u>
Non-flat ⁴	200
Flat	100

4.1.2 Aromatic Compounds. The product must contain no more than 1.0% by weight of the sum total of aromatic compounds. Testing for the concentration of these compounds will be performed if they are determined to be present in the product during a materials audit.

4.2 Chemical Component Restrictions. The manufacturer shall demonstrate that the following chemical compounds are not used as ingredients in the manufacture of the product.

4.2.1 Halomethanes
methylene chloride

4.2.2 Chlorinated ethanes

1,1,1-trichloroethane

4.2.3 Aromatic solvents

benzene
toluene (methylbenzene)

ethylbenzene

4.2.4 Chlorinated ethylenes

vinyl chloride

4.2.5 Polynuclear aromatics

naphthalene

4.2.6 Chlorobenzenes

1,2-dichlorobenzene

4.2.7 Phthalate esters

di (2-ethylhexyl) phthalate
butyl benzyl phthalate
di-n-butyl phthalate
di-n-octyl phthalate
diethyl phthalate
dimethyl phthalate

4.2.8 Miscellaneous semi-volatile organics

isophorone

4.2.9 Metals and their compounds

antimony
cadmium
hexavalent chromium
lead
mercury

4.2.10 Preservatives (antifouling agents)

formaldehyde

4.2.11 Ketones

methyl ethyl ketone
methyl isobutyl ketone

4.2.12 Miscellaneous volatile organics

acrolein
acrylonitrile

5. Packaging Requirements.

5.1 Toxics in Packaging.

5.1.1 The manufacturer shall demonstrate that paint cans and their components are not fabricated with lead.

Appendix: Labeling Requirements for Certification by Green Seal

Unless otherwise approved in writing by Green Seal, the following labeling requirements shall apply:

1. The Green Seal Certification Mark must appear on the packaging.
2. Whenever the certification mark appears on a package or product, the product or package must contain a description of the basis for the certification. The description shall be in a location, style, and typeface that are easily readable by the consumer. The description shall read as follows:

This product meets Green Seal environmental standards for volatile organic compounds (VOCs) and other ingredients.

3. The packaging shall be accompanied by a brief statement discouraging disposal into drains and encouraging consultation with local authorities for disposal requirements or recycling opportunities.
4. Paints which have been formulated without VOCs shall be designated Class A and may contain a special designation to that effect on the label.

-
1. ASTM D16-91, *Standard Terminology Relating to Paint, Varnish, Lacquer, and Related Products*. Stains and clear finishes, which are included in the ASTM definition, are not covered by this standard.
 2. 2 If the manufacturer has not characterized the paint as to gloss, the specular gloss level at 60° will be determined. Flat paints are those which register less than 5 and non-flat paints are those which register a 5 or greater. The gloss reading will be determined by ASTM D523-89, Standard Test Method for Specular Gloss.
 3. See note # 2.
 4. See note #2.

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Environmental Standard for Food-Service Packaging (GS-35)

Part A: Rigid Containers

First Edition, March 15, 2000

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1. Scope — This recommended standard establishes environmental requirements for Food-service Food Packaging. The scope of this standard is for food-service food packaging, which includes single-use containers for packaging or carry-out of products from restaurants and other retail food service establishments. Part A of this standard is for rigid containers and includes hinged containers and two-part containers. An additional container type will be addressed in the future: Part B will include flexible wraps.

2. Definitions

2.1 Compostable: Capable of undergoing biological decomposition in a compost site as part of an available program, such that the material (that is, feedstock) is not visually distinguishable and breaks down to carbon dioxide, water, inorganic compounds, and biomass, at a rate consistent with known compostable materials.

2.2 Recycled Content: A material that has been recovered or otherwise diverted from the solid waste stream, either during the manufacturing process (pre-consumer), or after consumer use (post-consumer).

3. 3.0 Need for Rigidity

Part A: Rigid Containers

The manufacturer must provide to the distributor or user the following criteria describing when such packaging should be used: A rigid package that is moisture-resistant under normal use conditions is necessary for liquid or semi-solid foods because other packages would not contain food sufficiently; or Rigidity is necessary to protect the structure of the food under normal handling and storage conditions, and consumer transit conditions.

Part B: Reserved

4. 4.0 Product-Specific Performance Requirements

Part A: Rigid Containers

4.1 Grease Resistance: The package material must not permit grease to penetrate for a minimum of twenty minutes as tested with ISO 5634 Paper and Board - Determination of Grease Resistance.

4.2 Water and Moisture Resistance: The package material must not permit moisture or small amounts of water to penetrate for a minimum of twenty minutes as tested with modified ISO 5634 Paper and Board - Determination of

Grease Resistance. The modification is described in Attachment A.

4.3 Compression Resistance: The package must have a strength to volume ratio of at least 1.0 g/cm³ as tested using ASTM D 4577-94 Standard Test Method for Compression Resistance of a Container under Constant Load.

Part B: Reserved

5. 5.0 Product-Specific Health and Environmental Requirements

Part A: Rigid Containers

5.1 Recycled Content: The package shall have a minimum recycled content of 45%. The manufacturer must demonstrate that any pre-consumer material used to meet the recycled content requirement would otherwise have entered the solid waste stream. All recycled materials used in the package must meet U.S. Food and Drug Administration regulations and standards for use of recycled materials in food packaging.

5.2 Wood Fiber: Any wood fiber, including paper fiber, used in the product shall not be bleached with chlorine or chlorine compounds (such as hypochlorite and chlorine dioxide). For post-consumer recycled fiber, this requirement applies to the recycling process and not to the original process of producing the fiber prior to first use by the consumer.

5.3 Volume-to-Weight: The package must have a minimum volume-to-weight ratio of 30.0 cm³ per gram.

5.4 Compostability: The material shall be compostable in accordance with ASTM D6400, Standard Specification for Compostable Plastics.

5.5 Toxics in Packaging and Inks: Packaging must not contain inks, dyes, stabilizers, or any other additives to which any lead, cadmium, mercury, or hexavalent chromium has been intentionally introduced. The sum of the concentration levels of lead, cadmium, mercury, and hexavalent chromium present in any package or packaging component must not exceed 100 parts per million by weight.

Part B: Reserved

Appendix A: Labeling Requirements for Certification by Green Seal

Unless otherwise approved in writing by Green Seal, the following requirements shall apply:

1. The Green Seal Certification Mark may appear on the product.
2. Whenever the Green Seal Certification Mark appears, it shall be accompanied by a description of the basis of certification. This description shall be in a location, style, and typeface that are easily readable by the consumer. The description

shall read as follows:

"This product meets Green Seal's standards for rigid food-service food packaging based on its recycled content, use of unbleached or non-chlorine bleached fiber (where wood or paper fiber is used), and compostability in centralized composting facilities where they are available. Whenever possible non-rigid packaging is recommended over rigid to minimize the amount of waste produced and other environmental impacts."

3. In each bulk package of the product there should be a flier stating the conditions under which rigid packaging is needed and should be used. The flier should also contain information on proper disposal, with an emphasis on composting where facilities are available. Alternatively or in addition, a letter to the appropriate official in the user organization could describe the appropriate conditions for use and disposal.

ATTACHMENT A

Modification of ISO 5634: Paper and Board Grease Resistance:

The test method presented in ISO 5634 should be followed to test for moisture resistance with the following modifications:

1. Replace standard grease with distilled/deionized water.
2. Replace the fat-soluble red dye with a water-soluble red dye.

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ENVIRONMENTALLY PREFERABLE PURCHASING UPDATES

The three latest EPP updates are included on this CD. To check for more recent updates, Please check the EPA Web site at the following address:

<http://www.epa.gov/oppt/epp/documents/docupdates.htm>



EPPP Update

Issue 11 | August 2002 ENVIRONMENTALLY PREFERABLE PURCHASING

The Greening of Our National Parks

The National Park Service (NPS), the National Recreation and Park Association, and EPA's EPP program have joined together to move our national parks toward sustainability by focusing on greening a number of park functions, including purchasing, maintenance, planning, interpretation, and concessions. A key element of the partnership is demonstrating to park staff, managers, and visitors that environmentally preferable purchasing is a tool to achieve their sustainability goals.

To kick off this endeavor, NPS held its first charrette at Big Cypress National Preserve in south Florida. The park's Superintendent, John Donohue, made opening remarks and emphasized that part of NPS' mission is to be "demonstrators, not regulators." Furthermore, he discussed the opportunity to educate more than 280 million park visitors each year about sustainability approaches, including greener products and services. During the first day of the charrette, NPS experts presented brief overviews of key issues and approaches in areas such as transportation, facilities, operations, and procurement.

< Continued on Page 2 >

Highlights

- Greening Our National Parks
- Sustainable Public Housing
- Federal Network for Sustainability
- Shopping Online for Green Office Supplies
- New CPG Database
- And More!

EPP PIONEERS:

Planning for a Green Future

Kathy Seikel knows a bit about "green" purchasing. After working for 8 years in EPA's Office of Acquisition Management (OAM)—where she headed up the staff responsible for ensuring the integrity of EPA's \$4 billion-a-year contracted programs—she made a transition to EPA's Office of Prevention, Pesticides and Toxic Substances (OPPTS) where she served as the senior policy advisor for grants and contracts. When an opportunity arose for Kathy to take a temporary position on OPPTS' EPP team, she leapt at the chance to combine her extensive technical skills in federal procurement with her commitment to the

environment. Kathy recognized EPA's unique position as a promoter of governmentwide green purchasing and a major procurer of services and supplies. Working with OAM management, she cleared the way for EPA to "walk the talk" in green contracting by pursuing opportunities for converting conventional contracts into EPP contracts.

Kathy began this process by integrating pollution prevention principles into the purchase of products, but soon expanded her scope to include services, which



< Continued on Page 11 >

Conference Helps

EPP in Practice

The *EPP Update* is highlighting a variety of paper types that EPA has determined to have certain positive environmental attributes. The paper choice for this issue is *Vanguard Eco Blend*. Look to future issues of the *EPP Update* to highlight additional paper types.

Well, It Happened Again....

As some of our readers might have realized, the paper actually used to print *EPP Update* #10 was not the paper EPA had specified. The newsletter was supposed to be printed on Living Tree Paper Company's Vanguard Eco Blend—a processed chlorine-free (PCF) paper that includes 25 percent virgin hemp and 75 percent postconsumer fiber. The paper used for *Update* #10 was actually the standard paper used by EPA for all of its quick-turnaround contract jobs. The specification for that paper is the same except that the 25 percent virgin hemp fiber was actually 25 percent postconsumer fiber, making it a 100 percent postconsumer fiber, PCF paper (which has a fine environmental profile in its own right). We also incorrectly referred to the paper in the article as “100 percent recycled content” when it should have read “totally free of virgin tree pulp.”

How Could This Happen?

The first step of the EPP process involves “defining EPP,” while the second step deals with “fitting EPP into the procurement process.” Despite establishing procedures with EPA's print shop after *Update* #4 was printed on the standard contract paper (30 percent postconsumer paper at the time) instead of the kenaf/postconsumer blend EPA had specified, mistakes can still be made. Mistakes happen most often when a special procedure is requested that deviates from standard practice. Until environmentally preferable products or services are offered as the standard practice, there may be a bump in the road here and there, but EPP pioneers keep going!

Let's Try It Again...

This issue of the *EPP Update* is printed on Vanguard Eco Blend processed chlorine-free (PCF) paper, including 25 percent virgin hemp and 75 percent postconsumer fiber. For further information on Vanguard Eco Blend or other Living Tree papers, contact the Living Tree Paper Company at 800 309-2974, or visit the company's Web site at <www.livingtreepaper.com>.

More than 130 government and private sector purchasing officials and other interested parties from around the world gathered in Philadelphia, Pennsylvania, from April 22 to 25 to learn more about environmentally preferable purchasing. The first-ever North American Conference on Green Purchasing, organized and co-hosted by the Center for a New American Dream (the Center) and TerraChoice Environmental Services, Inc., attracted people from 7 countries and 25 U.S. states.

Conference attendees heard from several notable speakers, including the Honourable Gilbert Parent, Canadian Ambassador for the Environment, and Ray Anderson, Chairman of Interface, Inc., a Fortune 500 company that strives for sustainability in all aspects of its floor covering production process. They also participated in a wide variety of sessions devoted to specific environmental pur-

NPS < Continued from Page 1 >

On the second day, participants worked in small groups on these issues, developing short-term, interim, and long-term goals and actions for Big Cypress. This



event was very well-received by the Big Cypress managers and staff, as well as participants from other parks.

Based on lessons from the two-day event, NPS expects that the charrette will serve as a model for sustainability planning at other national parks designated as Centers for

Further Green Purchasing

chasing topics, such as how to design an environmentally preferable purchasing program, how to “sell” the environmental purchasing concept to political leaders and other key audiences, and how to leverage the power of institutional purchasing to increase product availability. Participants debated the future of lifecycle assessments and eco-labels in sessions on these topics. They also attended sessions devoted to specific commodity areas to learn about the availability of more environmentally preferable office products, paper, cleaning products, and electricity options.

“One of the most exciting aspects of the conference,” according to Betsy Taylor, executive director for the Center, “was bringing together so many experts from across the country and around the world to share their knowledge with the state and local government purchasers we are trying to help.”



The conference was held at the Sheraton Rittenhouse, which conference organizers consider one of the most environmentally preferable hotels in the United States. Conference proceedings will be available soon on the Center’s Procurement Strategies Web site. For additional information about the conference or the Center’s purchasing program, visit <www.newdream.org/procure> or e-mail Scot Case at <scot@newdream.org>.

Environmental Innovation (CEI). Several more charrettes will take place in the next year. Big Cypress National Preserve is one of 20 CEIs in the nation. CEIs are park areas where research, development, and appreciation of sustainable practices occur. The intent is for these areas to serve as catalysts to teach and inspire people with

concepts and values of sustainability. One of the key expectations is that these CEI parks will be showcases for environmentally preferable products and services.

For more information on the Big Cypress charrette or CEIs, contact Julie Shannon of EPA at 202 564-8834 or Shawn Norton of NPS at 202 565-1260.

Charrette: *n.* An intensive planning workshop that allows for multidisciplinary participation from a variety of stakeholders to create an integrated design of a building, landscape, or community.

Several key action items emerged from the charrette, which will guide Big Cypress’ greening activities:

- Form green teams, which will help keep momentum going.
- Communicate the results of the charrette to other park staff.
- Educate park visitors about the new green initiatives.
- Become a leader and model for other national parks, as well as state and local parks.

Bringing HOPE

The cramped, no-frills, barracks-style buildings along Northwest 22nd Avenue in Miami, Florida, symbolize the stigma of public housing. Established in 1954, the Scott Homes development consists of 754 dwelling units. More than a decade later, Carver Homes built 96 units right next door. Although both of these public housing projects were constructed to meet the rising demand for affordable housing at the time, today these developments—the largest public housing complex in Florida—appear outdated and raise serious structural and health concerns, making Scott/Carver Homes overdue for redevelopment.

Unique partnerships and fortunate circumstances have given Scott/Carver Homes and its residents a second chance. Community representatives, local law enforcement, environmental groups, federal agencies, private corporations, and numerous other stakeholders came together over two intense days in December 2001 to assist the Miami-Dade Housing Agency (MDHA) in planning a sustainable vision for Scott/Carver Homes. The design charrette provided a unique forum for developing environmentally sustainable solutions for the community—from deconstruction to demolition to redevelopment.

EPA's EPP program supported the Southface Energy Institute in convening the design charrette. In addition, the EPP program provided technical assistance to a working group charged with recommending "green" building materials to MDHA and the design team. The following is a summary of the recommendations from the various stakeholders comprising the working group. For a more detailed list of these recommendations or to review each of the working group's recommendations on a variety of sustainable design concepts, read the Final Report at: <http://cool.southface.org/home/courses/HOPE-VI-Report.pdf>.

HOPE's Goals

The transformation of Scott/Carver Homes through HUD's HOPE VI revitalization grant program is designed "to end physical, social, and economic isolation of obsolete and distressed public housing by recreating and supporting sustainable communities and lifting residents from dependence and persistent poverty."

to a Community in Despair

Design Charrette Recommendations*

Specify Environmentally Preferable and Locally Produced Materials in Contract Language

The following resources can help when choosing environmentally preferable products:

- EPA's EPP Database contains green building contract language, voluntary standards, and case studies: <www.epa.gov/oppt/epp/database.htm>.
- Building for Environmental and Economic Sustainability is a software program that supports lifecycle costing and environmental impact decision making: <www.epa.gov/oppt/epp/bees.htm>.

Provide Good Indoor Environmental Quality for Residents

- Select and specify no or low-volatile organic compounds (VOCs) in paints and finishes.
- Select hard flooring surfaces in non-bedroom areas.
- If using particle board or medium-density fiberboard, coat with low- or no-VOC paint.
- Install and upgrade air filters.
- Design a separate usable entry with seating area to allow removal of outerwear prior to entering home.

Choose Materials That Are Appropriately Durable

Providing residents with durable structures and materials keeps operation and maintenance requirements to a minimum. Using lifecycle costing, products and materials can be appropriately compared to determine cost and maintenance over time. For example, outdoor deck and railing material made from recycled plastic lumber is long-lasting, does not use toxic preservatives, and requires no sealants or coatings, as wood does.

Provide Education to the Community Before and After Redevelopment

Project success often hinges on community commitment. Addressing perceptions of “poor quality” that might mistakenly be associated with salvaged materials, stained concrete floors, or recycled products is critical. Try the following techniques to help residents feel comfortable with the materials used in the development of their homes:

- Display material options and provide “touch and feel” opportunities.
- Create a model home furnished and replete with labeled “green” products.
- Provide a photo album of other homes employing similar products and technologies.
- Show video footage of community charrettes to showcase transparency of decision-making.

Conduct Operation and Maintenance Education

To maintain a healthy environment for residents, focus continuing education efforts on:

- Healthy cleaning products.
- Operation and maintenance of air-conditioning and heating systems.
- Appropriate and natural methods of pest management (indoor and outdoor pests).
- Furniture and finishing choices as they relate to indoor environmental quality.
- Energy- and water-saving practices.



For more information, contact Alison Kinn of EPA at 202 564-8859 or by e-mail at <kinn.alison@epa.gov>.

* These recommendations are not necessarily the views of EPA. They were developed by multiple stakeholders participating in the design charrette.

EPP Investigative Reporting:

How Easy is it to Shop Online for

The IRS anticipates spending up to \$15 million a year on office supplies, while DOE's Pacific Northwest Laboratory spends approximately \$34 million.



These days, when government workers need to purchase copy paper or file folders, they will likely pull out a government-issued credit card. These cards can be used on “micropurchases,” which for most government purchase card holders is \$2,500 or less, a limit that covers most office supplies. But how easy is it for the typical customer to buy a “green” office product from the top office product suppliers? The majority of office supplies sold to the federal government are purchased through GSA Advantage! or other major office product companies such as Staples, Office Depot, Boise Cascade Office Products, and Corporate Express. In addition, some office supply companies, such as Recycled Office Products, focus on providing only green products to their customers. The EPP program tried its hand at buying green products from these suppliers’ Web sites and compiled some interesting findings.

Does the Company Sell Green Products?

GSA carries several “green” items and, as the government supplier of office products, establishes some basic environmental criteria for vendors. For example, all GSA copy paper contains at least 30 percent postconsumer content, meeting the requirements set in Executive Order 13101. All five private companies we visited also sell products that they identify as “green.” Most are items with recycled-content, including paper, plastic products, and remanufactured toner cartridges. We found chlorine-free paper products at Staples and Recycled Office Products, and

nontoxic and/or biodegradable items on four of the companies’ Web sites. Boise Cascade and Corporate Express carry both 30 percent and 100 percent recycled-content paper.

How are Green Products Identified?

GSA has special icons that denote green attributes, including “environmental items,” “CPG compliant,” and “recycled content.” From the Web site, however, it is difficult to determine which products are considered “environmental items.” Certain office products have a tree icon representing their qualification as an “environmental item,” but the basis of this distinction is unclear. Three of the private companies also have a way of distinguishing environmental products from other items. Staples has a “Recycled Products” link, which shows up on top of the page when you shop for paper. Clicking on the icon gives you a list of recycled paper products and links to more information about recycling. Recycled-content items on Corporate Express’ Web site have a small icon next to them, as do the items on the Recycled Office Products Web site, even though most of them are recycled to begin with.

Is Environmental Attribute Information Available?

Identifying a product as “recycled” or “environmentally friendly” is one thing, but determining exactly what attributes a product has can be difficult. Fortunately, GSA and all five companies provide relatively detailed attribute information. GSA relies on the vendor to provide environmental attribute information,

Green Office Supplies?



meaning the level of detail is dependent on what the vendor submits. In preliminary searches, most GSA office products had environmental attribute information available. All five private companies list the recycled and/or postconsumer content percentages of recycled products. In some cases, they include more specific information, such as chlorine-free or acid-free. Office Depot and Recycled Office Products even include information about the environmental attributes of product packaging (e.g., recycled-content, soy-based inks), while Corporate Express explains that its “environmentally friendly” cleaners are non-toxic and biodegradable. Unfortunately, none of the nongovernment companies’

Web sites mentioned third-party certification (e.g., Green Seal) or CPG compliance of products, although Staples sells a few items bearing the Energy Star® label.

Are Government Green Purchasing Requirements Indicated?

Most of the companies do not describe the federal government’s green purchasing requirements outlined in Executive Order 13101. Boise Cascade Office Products states that its 30 percent postconsumer-content paper meets “federal and state guidelines for recycled content,” but this claim is not applied to its 100 percent postconsumer-content paper, which obviously exceeds the

< Continued on Page 12 >

For more information on GSA Advantage! and the companies discussed in this article, visit their Web sites:

- **Boise Cascade Office Products**
<www.boiseoffice.com>;
Boise Cascade Company
<www.boisecascade.com>
- **Corporate Express**
<www.corporateexpress.com>
- **GSA Advantage**
<www.gsaadvantage.gov>
- **Office Depot**
<www.officedepot.com>
- **Recycled Office Products**
<www.recycledofficeproducts.com>
- **Staples**
<www.staples.com>

Some Food for Thought...

Online ordering systems are increasingly becoming valuable tools for federal purchasers in identifying and purchasing greener products and services. Here are some ideas for these companies as they continue to improve the green features of their systems:

- GSA-specific recommendations: standardize environmental product descriptions; link to the EPP Database <www.epa.gov/oppt/epp/tools/database.htm> and other EPP resources; enable the sorting of search results by percent recycled content; clarify the definition of “environmental items”; feature only CPG-compliant items.
 - Link to Executive Order 13101 in key places.
 - Specify which products are CPG compliant (visit <www.epa.gov/cpg> for more information).
 - Specify which products meet Green Seal’s new guidelines in its office products *Choose Green Report* (visit <www.greenseal.org> for more information).
 - Spearhead product “take-back” programs (for batteries, remanufactured toner cartridges, and other products) in participation with manufacturers.
 - Prepare to respond quickly to upcoming demand for biobased products—the 2002 Farm Bill includes new provisions for federal procurement of these items.
 - Continue aggressively pursuing and increasing the availability of green products on the Web sites.
 - Develop ways to help the government track purchases of greener products more efficiently.
- If any of our readers have comments or additional suggestions, please contact the EPP program at <epp.pilot@epa.gov>.

What Happened to the EPP Guides?

Last December, the EPP program published six purchasing guides on the following product and service categories: Cleaning Products, Meetings and Conferences, Carpet, Electronics, Copiers, and Food Serveware. Following the release of the guides, EPA heard both positive and negative feedback from a wide variety of stakeholders. Generally, some of our stakeholders' greatest concerns

focused on EPA's process for developing the guides. While we had consulted with many of our colleagues in and outside the Agency, many interested stakeholders did not have the opportunity to review and comment on the guides prior to publication. **Due to these concerns, we suspended distribution and are now treating the guides as drafts for public comment.** A formal review process will be initiated in the near future (see text box).

EPA conceived the guides as a way to communicate the challenges, successes, and resources associated with various products and services, focusing on how to incorporate environmental considerations into purchasing decisions. In addition, each guide sets out to present to purchasers the potential environmental impacts of their decisions.

Some stakeholders expressed the concern that the guides were endorsing certain products. EPA's EPP program does not endorse products nor does it recommend or discourage the purchase of specific products. However, the program does provide guidance and information on relevant environmental attributes for a number of product and service categories. Environmentally preferable purchasing seeks the overall best value, taking into account considerations of price, performance, and environmental impact. Because purchasers typically have well-established sources of information and methods for evaluating price and performance, the EPP program's information products (like the guides) focus primarily on the environmental factors in the EPP equation.

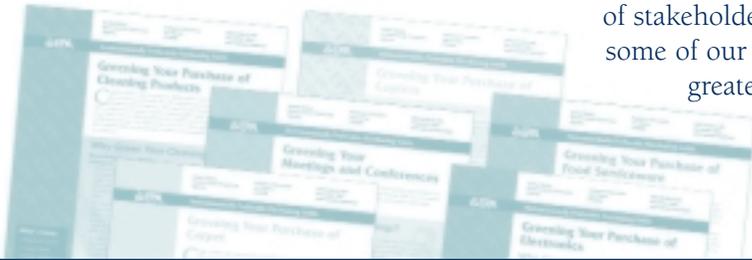
Please "stay tuned" to our Web site for the latest developments. We look forward to working with all of our stakeholders on creating valuable EPP resources.

The EPP program strives to operate in a transparent manner, with open participation and counsel from our stakeholders. However, because of the concerns raised, we have developed a new process for the EPP purchasing guides to allow for broader review and comment from all stakeholders. A brief description of the new process is shown below:

Process for development and review of EPP product guides:

1. Make changes based upon comments and information received to date.
2. Publish notice in the Federal Register announcing that the draft guides are available for review and soliciting input on existing standards, lifecycle impacts, and other relevant information.
3. Send revised draft to key stakeholders and simultaneously post on the EPP Web site as draft, with request for comments within 30 days.
4. Consider the appropriateness of a stakeholder meeting for guides.
5. Establish record for comments and publicize (via Web site and other means) procedures for submitting/reviewing comments.
6. Make further revisions as necessary based on additional comments and post revised document along with comments on the Web site.
7. Allow for stakeholders with major concerns to request a meeting before we publish the document as final.

At this time, we are not contemplating any new purchasing guides. Should we determine that additional guides are appropriate, we will follow a similar process for their development and review.



EPA Makes Buying Recycled A Snap

This summer, EPA will unveil a new database to make complying with its Comprehensive Procurement Guidelines (CPG) easier. CPG forms the foundation of the federal government's buy-recycled program, which requires agencies to purchase certain designated items containing the highest percentage of recycled content possible. The searchable database of vendors who sell or distribute CPG-designated products with recycled content will be a powerful tool that allows users to search for vendors of a specific CPG product (e.g., Floor Tiles), product category (e.g., Construction Products), or type of material (e.g., Plastic). In addition, users will be able to search directly for a specific vendor by typing all or part of the vendor's name in a search field.

According to Terry Grist, EPA program manager for CPG, "The purpose of moving to a database system is to provide procurement officials with a more accessible and reliable reference source they can use to identify vendors of CPG-designated items." Mr. Grist explains, "In the past, our lists of manufacturers and suppliers on the CPG Web site were static and required extensive research to maintain, which greatly reduced the utility of the information." The new automated system will allow EPA to more readily update and maintain the vendor information.

The database is expected to be fully operational on the CPG Web site <www.epa.gov/cpg> by the end of the summer, with continued efforts being made to update and expand the information.



www.epa.gov/cpg





Sharing the Knowledge:

More and More Agencies Seek Information about Sustainability

“Of special note is one of the guiding principles contained in the Statement of Unity – ‘to act as a catalyst for change.’ I believe FNS represents that catalyst. As a group, we can exert a more positive force for change than we can now do individually. We will also gain momentum for change in capitalizing on one another’s ideas.”

—James T. Hill, Lieutenant General, U.S. Army, Fort Lewis, Washington

Imagine a place where federal employees can go to voluntarily learn about and share sustainability practices. Since its inception on Earth Day 2000, the Federal Network for Sustainability (FNS) has provided a virtual home for just that. A voluntary, non-regulatory network of federal government agencies in the western United States, FNS promotes interagency collaboration in the areas of planning, purchasing, and managing valuable resources. FNS is focusing on the following four initiatives this year:

- Electronic Products Stewardship
- Environmental Management Systems
- Green Power Procurement
- Greening Federal Copier Paper

Since our last article on this issue in EPP Update #9 (EPA747-N-01-002), FNS has expanded the scope of its program by leaps and bounds. While most of its members are still federal agencies from the West, FNS is also working with various city and state governments and interest groups across the country as they begin thinking about sustainable practices. Perhaps one of the biggest changes the FNS steering committee has seen over the past year is that other groups are seeking them out.

“FNS is at a point now where people are coming to us for information. Many of the agencies don’t know very much about sustainability, and often those that do are not sure how to go about implementing it,” said Alan Hurt, FNS Chair. Hoping to become a central clearinghouse for communicating the successes and challenges of implementing several environmental Executive Orders (13148, 13149, 13150, 13101, and 13123), as well as long-term sus-

tainable practices, FNS is conducting surveys and collecting information from agencies that exemplify best business practices. “These case studies,” Hurt says, “will help provide answers to those who need help implementing sustainability activities.”

As FNS continues to add federal agencies and others to its membership, current members have taken a lead on many of the initiatives. The Department of Defense, for example, is currently promoting the principles of Environmental Management Systems (EMS) through its senior management and within other agencies. “In addition,” Hurt adds, “the Navy is actively incorporating EMS principles as a standardized process in all of its business lines of operation. The key point here is that EMS is inherent to business operations, as well as being important from an environmental standpoint.”

With a busy year ahead, FNS will continue to build and collect case studies for each initiative, increase collaboration among federal agencies, continue its outreach and education efforts, and keep the lines of communication open among the network. It is this communication that has propelled FNS forward over the past 2 years, allowing member agencies to use one another’s expertise for future initiatives.

For more information about FNS or to become a member, please visit www.federalsustainability.org or contact FNS Chair Alan Hurt at 619 524-6253. For information on how you can participate in the FNS Paper Initiative contact Barbara Lither at 206 553-1191.

Pioneers < Continued from Page 1 >

constitute the bulk of EPA's acquisition budget. When EPA was about to issue an RFP for meeting management support, Kathy seized the occasion and worked with contract officials to incorporate environmental criteria into the RFP. "I felt that green conferencing would serve as a living advertisement for what EPA stands for," says Kathy. In the RFP, companies had the opportunity to demonstrate their ingenuity and creativity for planning green conferences.

Enter MEGA-TECH, Inc. (MTI) under the leadership of Harlan Lee, a former conference planner for the State Department. EPA ultimately awarded MTI the meetings management support contract. MTI, an award-winning, woman-owned small business based in Falls Church, Virginia, provides environmental and information technology support for a variety of federal agencies.

Harlan viewed the EPA contract as an opportunity for MTI to develop expertise in green conference support and introduce the concept to others. Lacking green conference models to follow, Harlan and his staff embarked on a mission to develop guidelines and specifications for hosting environmentally conscious meetings. Building from suggestions for green conference activities found on EPA's Web site, the MTI team developed an extensive list of environmental initiatives to undertake when planning a green event.

Harlan's team now considers an assortment of environmental criteria when selecting a conference venue, including proximity to mass transit;

lodging facility certification by Green Seal based on its environmental standard for lodging properties; facility membership in either Green Globe or the Green Hotel and Motel Association, which are organizations that encourage the travel and tourism industries to

engage in environmentally sound initiatives; electronic registration and/or checkout systems that save paper; well-developed recycling programs; and employee education on green policies.

Harlan and his staff also take actions to provide environmentally responsible

amenities and services throughout the conference, such as establishing Web sites to post conference information; offering online services; distributing conference materials on diskette or CD-ROM; printing hard copy materials on recycled paper; and using reusable cups, dishes, napkins, and serving containers.

Under this EPA contract, MTI has been supporting green conferences and meetings around the country. In March 2002, MTI organized the annual EPA OPPTS National and Division Directors meeting in Seattle, Washington. Harlan and his staff continually investigate options for enhancing green events and state that they "are happy to be in a position to lead the way in green conferencing."

If you would like to see the "green" contract language from EPA's OPPTS meeting planning support contract or are interested in current initiatives and tools that are making planning and supplying green meetings easier, please visit <www.epa.gov/oppt/greenmeetings> or contact Russell Clark at EPA at 202 564-8856.



Office Supplies < Continued from Page 7 >

standards. Similarly, in Office Depot's description of its brand of 35 percent postconsumer-content paper, there is an indication that it exceeds "federal guidelines for recycled paper," but the site does not provide any other specifics. Staples' Web site includes a couple of articles about recycling and buying recycled office products, and one footnote references Executive Order 13101.

What Does a Search Turn Up?

Let's face it—purchasers don't always have time to leisurely browse through Web sites or catalogs for green products, but good search engines can help. We tested the search engines of these companies by searching on two types of keywords: specific products (e.g., remanufactured toner cartridges) and environmental attributes (e.g., nontoxic, recycled). GSA Advantage! allows customers to specify

"environmental items" when searching or to perform a more general keyword search. However, GSA's large number of vendors and its reliance on manufacturer-supplied attribute information sometimes produces confusing search results (e.g., "pcf" and "processed chlorine free" yield different results). Corporate Express and Office Depot allow customers to specify certain attributes when searching, including "recycled" and "remanufactured." The other companies had more general, keyword search engines, yet they still returned lists of items when we searched on environmental attributes, such as "recycled" or "nontoxic."



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EPP Update

Issue 10 | January 2002

ENVIRONMENTALLY PREFERABLE PURCHASING

Environmental Management Systems Drive Agencies To Meet EPP Goals

Organizations around the world are using Environmental Management Systems (EMSs) more and more to integrate environmental considerations into day-to-day decisions and practices. Recently, public agency facilities at all levels—federal, state, and local—have begun implementing EMSs to reduce their operational costs and to improve overall environmental performance. Moreover, Executive Order 13148, “Greening the Government Through Leadership in Environmental Management” (which can be found at: www.fedgovcontracts.com/fedregs/65f24593.htm), requires federal agencies to implement EMSs by the end of 2005 at all applicable facilities.

< Continued on Page 2 >

Highlights

- EMSs and EPP
- New Product-Specific Purchasing Guides
- Federal Electronics Stewardship Forum
- EPP Grants
- Biobased Lubricants
- NPS Partnership
- And More!

PROFILE OF A PIONEER:

Working Toward a Greener EPA

The new EPA Headquarters complex is located in the historic Federal Triangle District in the heart of the Nation's capital. Part of what makes these new and old buildings so important goes beyond their impressive architecture. The buildings incorporated sustainable building practices where feasible through all phases of design and construction. Thanks to many dedicated individuals, including EPA's Cathy Berlow, the EPA Headquarters Project became a reality.

Cathy was involved in EPA's headquarters project long before she was an EPA employee. She had previously worked at the Pennsylvania Avenue Development

Corporation (PADC), a small federal government agency involved in the development of Pennsylvania Avenue and the original RFP for construction of the Ronald Reagan International Trade Building, which houses a variety of federal offices. Since EPA was going to be housed in the Ronald Reagan Building, Cathy's experience at PADC and the Ronald Reagan Building led her to accepting a position at EPA's New Headquarters Project.



< Continued on Page 9 >

EPP in Practice

The *EPP Update* is highlighting a variety of paper types that EPA has determined to have certain positive environmental attributes. The paper choice for this issue is *Vanguard Eco Blend*. Look to future issues of the *EPP Update* to highlight additional paper types.

Hemp Paper Is an Environmental Choice

This EPP Update is printed on Vanguard Eco Blend paper, developed by the Living Tree Paper Company. The paper is 100 percent processed chlorine-free (PCF), which helps reduce toxic dioxin and other persistent organic pollutants that are released into the environment.

The paper also contains 100 percent recycled content, which means no virgin wood (i.e., wood from cut trees) was used to produce the paper. Instead, the paper is produced using 25 percent hemp—which requires no wood or paper resources—and 75 percent postconsumer fiber. A similar product, Vanguard Recycled Plus, uses 10 percent hemp and 90 percent postconsumer waste and is a bright white color. All Living Tree papers use chlorine-free resources and postconsumer waste fibers, supporting the market for recycled paper and helping to reduce overall wood consumption.

For further information on Vanguard Eco Blend or other Living Tree papers, contact the Living Tree Paper Company at 800 309-2974, or visit the company's Web site at <www.livingtreepaper.com>.

EPA must not only comply with the Executive Order at its own facilities, but also has specific management and oversight responsibilities to assist other federal organizations in complying with the Order. In that role, EPA encourages the use of EMSs that focus on improved environmental performance and compliance, as well as pollution prevention and system performance. EMSs provide a framework for managing environmental responsibilities, including regulatory compliance. By improving overall environmental performance and putting more emphasis on pollution prevention and continuous improvement, EMSs also can help organizations move beyond compliance.

Purchasing decisions can have a significant impact on an organization's environmental performance and, thus, the EMS's success. EPA maintains a leadership role in supporting environmentally preferable purchasing and practices. Environmentally preferable products may have a variety of positive attributes—such as reducing the amount of virgin resources used, diverting materials from landfills, conserving energy and water, and generating fewer emissions during manufacture or use of the product. The benefits of purchasing environmentally preferable products become even more apparent to an organization implementing an EMS.

EPA's leadership role in promoting environmentally preferable purchasing also encourages other agencies to explore EMSs. The Interagency Work Group, chaired by Will Garvey, with EPA's Office of Federal Facility Enforcement, is responsible for assisting other federal agencies with EMSs by holding workshops and training sessions. According to Garvey, agencies across the federal community are becoming more aware of the EMS program—and the benefits it can provide—and are engaging in the planning process.

EPP—Environmentally Preferable Partnerships

EPA's Environmentally Preferable Purchasing program is partnering with the National Park Service (NPS) in a new initiative to help green our national parks. The purpose of this new partnership is to integrate green purchasing into our parks through a series of workshops that NPS is developing.

NPS has recently established 20 parks as Centers for Environmental Innovation (CEI) to advance the concept of sustainability. These will be park areas where research, development, and appreciation of sus-

A number of EPA offices have shared their experiences in incorporating EPP guidelines into their EMSs. Two reports from regions follow:

Region 10: Seattle, Washington

Officials have been developing a plan for setting up an EMS in EPA Region 10. The team has been working to define the nature and the scope of an EMS, as well as analyzing the potential for success. Region 10 already has made significant steps to minimize the environmental impacts associated with its internal purchases, which include computers and other office equipment, furniture, office supplies, and energy. Integrating all these pieces into an EMS allows the Region to comply with E.O. 13148 while increasing awareness of the sustainable practices and goals for future environmental impact reductions.

For more information about the Region 10 EMS, contact Bill Glasser with Region 10 at 206 553-7215 or <glasser.william@epa.gov>, or the new EMS Coordinator in Region 10, Clark Gaulding, at 206 553-1849 or <gaulding.clark@epa.gov>.



Region 8: Denver, Colorado

EPA's Region 8 also is designing an EMS. Representatives from each Assistant Regional Administrator's office formed a team and began holding meetings in Fall 2001. The region first hired a contractor for implementation support during the first 5 to 6 months of the project. Region 8 had already established some purchasing practices to reduce the environmental impacts of products and services used by employees.

The team identified areas for environmental impact analysis, including purchasing computers and related hardware; energy and water use; grants and contracts; meetings and conferences; and lunchrooms. The region's next step is identifying specific project ideas within these general categories. According to Dianne Thiel of Region 8, division offices in Region 8 will be able to use the information gathered during the EMS planning stages to help accomplish their missions. In addition, divisions with a specific need in mind can develop their own projects and contribute their information to the regional EMS.

For more information about the Region 8 EMS, contact Marie Zanolick with Region 8 at 303 312-6403 or <zanolick.marie@epa.gov>.



tainable practices occur and will serve as catalysts to teach and inspire people with concepts and values of sustainability. One of the key expectations of these CEI parks is that they will be showcases for environmentally preferable products and practices. CEIs will focus on educating staff and working with park partners to purchase more environmentally preferable products.

A key element of the sustainability training workshops is to demonstrate to park visitors, staff, and managers that environmentally preferable purchasing is a tool to achieve their sustainability goals. EPA's role in this

partnership will be to work directly with these parks to identify the types of products and services that will improve parks' resource stewardship capacity. The first workshop will be piloted at Big Cypress National Preserve in Florida March 26-27, 2002. NPS hopes that the partnership will expand to include other NPS-EPA opportunities that exist in programs such as Green Lights and Energy Star. For more information, please contact Shawn Norton at the National Park Service at 202 565-1260 or Julie Shannon at EPA at 202 564-8834.

EPP Supplements Its Suite of Tools with Product-Specific Purchasing Guides

For more information, contact EPA's Alison Kinn at 202 564-8859 or by e-mail at <kinn.alison@epa.gov>.

Government purchasers looking to procure “green” goods and services have a new resource at their disposal. EPA has recently produced a series of purchasing guides covering the following product and service categories: food service ware, copiers, cleaners, carpets, electronics, and meetings. These “one-stop shops” for green purchasing information describe the challenges, successes, and resources associated with each product or service, focusing on how to incorporate environmental considerations into purchasing decisions. Although the guides have been developed with government purchasers in mind, they may be useful to anyone who wants to buy greener products for their office or household.

Each guide offers a product-specific education about environmental impacts of purchasing decisions. For example, when buying food service ware, the green purchaser should consider products made from renewable resources, like agricultural waste; when buying copiers, the purchaser should look for a variety of energy- and paper-saving options currently offered by a number of manufacturers. The “Success Stories” section of each guide highlights how various government agencies have identified and purchased environmentally preferable products. The “Contacts and Resources” section will lead purchasers to groups defining what makes a certain product green and to organizations that are successfully practicing EPP.

The six, 6-page guides are available in an easy-to-use format on the EPP Program Web site at <www.epa.gov/oppt/epp>, or you may order hard copies of these colorful publications by contacting the Pollution Prevention Information Clearinghouse at 202 260-1023.

In the future, EPA expects to produce additional guides on other products, including paper, and will refine the content, if necessary, based on users’ response to this initial set. Let us know what you think!



Three-Day Conference Will Focus on Training Green Purchasers

The Center for a New American Dream, a nonprofit organization dedicated to helping Americans change the way they consume to help protect the environment, and TerraChoice, the contractor supporting Canada's eco-labeling program, are co-hosting an environmental purchasing conference April 22 to 25, 2002, in Philadelphia, Pennsylvania. The conference, which will be held at the Sheraton Rittenhouse, one of the greenest hotels in the United States, is open to government purchasing officials and private sector companies interested in increasing their environmentally preferable purchasing.

The conference is the first of its kind to focus on the needs of government and other institutional purchasers since EPA's 1997 EPP conference in Baltimore, Maryland. The conference will give participants the opportunity to learn about new EPP tools and strategies, as well as provide information on a wider variety of products and services that are now available. It also will give purchasers the opportunity to meet with others to compare notes about progress made and issues they're struggling with and provide a forum for them to work collaboratively and share information about green manufacturers and vendors.

The Center also has been sponsoring a series of free bimonthly conference calls for purchasers that focus on a variety of green purchasing topics. The first two calls addressed buying environmentally preferable cleaning products (October

and paper (December), and each included more than 100 participants from more than 30 states. Each call features product experts and government purchasers who have recently participated in green purchasing programs. Conference call participants receive a PowerPoint presentation when they register, so they can follow along with the speakers during the call. Future calls will cover energy efficiency and energy purchases, integrated pest management, paint, carpet, eco-labels, and other related topics.

For additional information on the conference or a schedule of upcoming conference calls, visit the Center's Web site at <www.newdream.org/procure>, or contact Scot Case at the Center for a New American Dream at 610 373-7703, or by e-mail at <scot@newdream.org>.



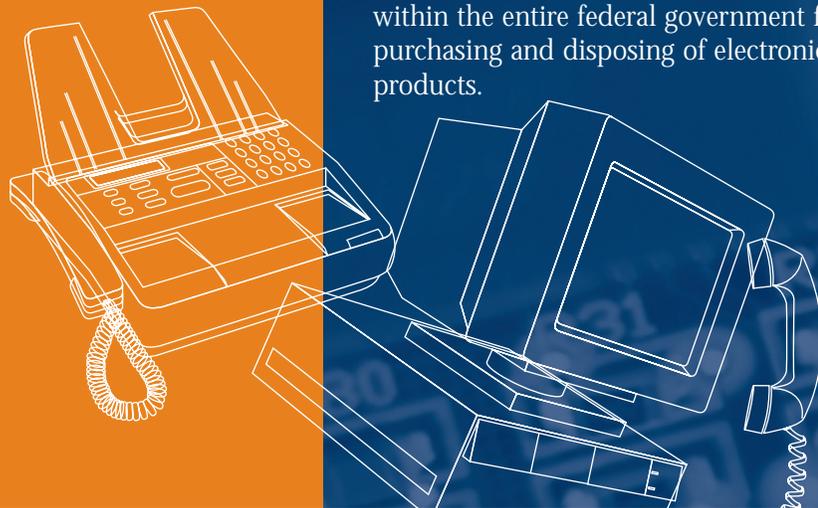
Federal Government Electronics

The MOU, presentations, and draft action plans from this forum are available on line for review and comment at www.deer2.com/stewardship.html.

To reduce the environmental impacts associated with governmental use and disposal of electronic equipment, a number of federal agencies recently signed a Memorandum of Understanding (MOU) to address this issue. Although individual federal agencies have made efforts to reduce this waste stream, such as favoring purchases of environmentally preferable and energy-efficient equipment, the MOU outlines ways agencies can build a more efficient infrastructure within the entire federal government for purchasing and disposing of electronic products.

The White House Task Force on Recycling, U.S. Postal Service, the Departments of Defense, Energy, and Interior, EPA, and the Council for Environmental Quality all signed the MOU on "Improving Environmental Management of Electronic Assets." The administration will work to sign up more agencies and is soliciting input from other public and private sector stakeholders. Electronic products covered by the MOU include computers and monitors, fax machines, phones, and other devices used in military and scientific applications, communications, and information systems.

The Federal Government Electronics Stewardship Forum held in October (see sidebar) was an opportunity to gather input from stakeholders on the proposed action plan for the MOU participants, as well as get feedback on an issues paper. The purpose of the Action Plan is to identify the goals, objectives, and strategies the MOU parties will commit to in order to reduce the overall environmen-



"Promising Practices" Will Guide You to EPP Success

Competitive bidding and contract processes often hinder agencies from buying environmentally preferable products. Many agencies realize the importance of environmentally preferable purchasing but question how they can apply it to their current purchasing process. To help educate federal purchasers, EPA's EPP program, showcases concrete examples of green purchasing success stories in its "Promising Practices Guide," available online at www.epa.gov/oppt/epp/ppg.

Distinct from other tools on the EPP Web site, the Promising Practices Guide

not only illustrates that environmentally preferable purchasing is possible, but also outlines the steps pioneers have taken to make green purchasing decisions. For example, the Guide shows how the Department of Interior (DOI) wrote EPP criteria into a solicitation for its new custodial contractor, to ensure use of environmentally sound cleaning products and to provide a safe, toxic-free working environment for janitors. Consequently, environmental preferability was a significant factor in the selection of the contractor, and DOI included "greening" language in the final contract.

EPA Grants Focus on EPP

EPA recently awarded three grants to support other organizations' environmentally preferable purchasing efforts. The grants aim to boost markets for "greener" products and services.

Foundation Helps Make Meetings Greener

EPA awarded a grant to the Oceans Blue Foundation to develop a Web-based tool to help meeting planners and others incorporate environmental considerations when organizing conferences and meetings. The Web tool will be market-tested in spring 2002, with a launch tentatively scheduled for July 2002. The foundation is a Canadian nonprofit that works to conserve marine and terrestrial environments by promoting environmentally responsible tourism and developing best-practice standards for all sectors of the tourism industry.

The purpose of the Web tool is to tell professional meeting planners, service providers, and the public about the environmental issues they should consider when planning meetings and events. With a user-friendly and interactive design, the tool will help users make environmentally sound choices when planning meetings.

"Meeting industry professionals, whether they be planners or suppliers, need the tools to be able to make appropriate decisions about how to minimize the impacts of their activities on the environment. This Web tool will provide them with easy, accessible guidelines and information to do just that," said Julie Shannon, Branch Chief of EPA's Prevention Integration Branch, Pollution Prevention Division.

For more information on Blue and Green Meetings, visit the Oceans Blue Web site at <www.oceansblue.org>, or e-mail <bluegreenmeetings@oceansblue.org> for further updates on the project.

Hotels Looking for a Green Seal

As part of its Green Meetings Initiative, EPA has awarded a grant to Green Seal to certify five Washington, D.C.-area hotels. Green Seal will evaluate hotels on their water and energy efficiency, fresh water usage, wastewater treatment, hazardous materials management, and environmentally preferable purchasing. The grant allows Green Seal to conduct the audits free of charge to the hotels. Green Seal plans to send an informational packet outlining the program to hotels, asking them if they would like to have their facility audited and certified. Green Seal's team of experts will evaluate the first five hotels to respond.

The goal is to market the District of Columbia as the first area to offer environmentally responsible lodging facilities and to grow the market for green hotel services. The program is supported by the government of the District of Columbia, select federal agencies, and corporations that will provide the buying power to increase the demand for green hotels. Government travelers and visitors will be encouraged to stay and hold their meetings in certified hotels. This, in turn, will help motivate others in the hotel industry to green their services—especially since business travel is a major source of revenue for the industry. In 2000, U.S. business travel expenditures totaled \$185 billion, with \$37 billion spent on accommodations.



For more information on Green Seal's Greening the Lodging Industry campaign, visit <www.greenseal.org/greeninglodge.htm>.

Nonprofit To Evaluate Environmental Paper Market

Conservatree, a nonprofit organization that works to grow the market for environmental papers, has received a grant from EPA to conduct a study on the obstacles slowing market development for these papers. The Recycled Paper Coalition will collaborate with Conservatree in researching issues hampering market development. The project will add collaborators with other areas of expertise as it progresses.

Conservatree will use a list of nearly 100 questions on issues and controversies within the environmental paper field to begin gathering perspectives from all interested and involved parties. "We want to talk to everyone involved in manufacturing, marketing, buying, and using environmental papers and hear as many different viewpoints as possible," said Susan Kinsella, executive director at Conservatree. "We hope to help make it more possible for people with differences of opinion to work together on achieving an environmentally and economically sustainable paper production system for the future."

More information is available at <www.conservatree.com/learn/ListenSnapshot/Listen.shtml>.



Profile < Continued from Page 1 >

At EPA, she spent 10 years working on EPA's New Headquarters Project, helping with the transition of EPA office space from Waterside Mall, where the agency had been housed since its inception, and other satellite buildings, to the new facilities in the Ronald Reagan Building and adjacent Ariel Rios Building and ICC/Customs (EPA East and West) Buildings. During that time, she worked with General Services Administration (GSA) contractors to make sure that the construction contracts met EPA's sustainability goals.

Cathy began pursuing her environmental interests in her early career as an architect. "My original focus was on historic preservation, but my interest in conservation issues flowed naturally from there," she said. "It was a natural progression, and for me it seemed like the right thing to do."

In May 2001, Cathy moved to EPA's Sustainable Facilities Practices Branch, where she still works on sustainability issues, but now in a national capacity. In her new post, Cathy examines how to apply the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED™) rating system to EPA facilities across the United States.

Cathy also is coordinating an effort through GSA to green the proposed EPA onsite cafeteria in the ICC Building and concession stands throughout the headquarters complex. The plan is to set up a program similar to the one adopted by the U.S. Department of the Interior, which incorporates several environmentally preferable products and practices.

EPA's EPP program extends a special thanks to Cathy for her continued efforts in sustainable construction and design.

Using Biobased Lubricants at Hydroelectric

Recent laboratory studies undertaken by the U.S. Department of Interior (DOI) show the superior performance of biobased lubricants under extreme pressure conditions at hydroelectric power facilities. These “green” lubricants can perform as well as or better than traditional lubricants, without the negative environmental impacts.

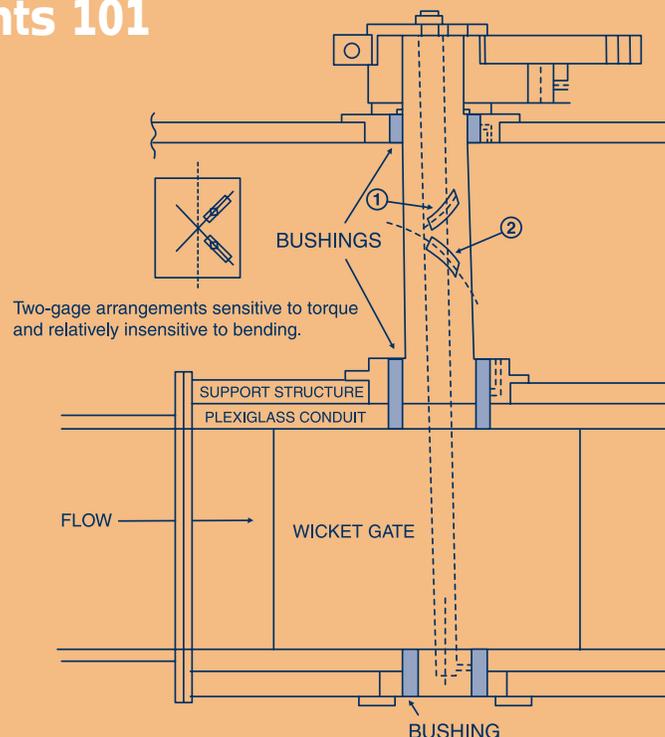
DOI’s Bureau of Reclamation operates 58 hydroelectric power plants in the Western United States. DOI is concerned about the environmental impact of grease released during the production of energy. Some wicket gate grease “washes out” from the turbine with the discharge water. Potential harm to aquatic life is a concern, as the petroleum hydrocarbons in traditional greases biodegrade fairly slowly and are highly toxic to aquatic species. Also, some petroleum greases contain toxic metals that can accumulate in the food chain.

In 1994, staff at Parker Dam in California began investigating the use of alternative greases in wicket gates. Parker Dam staff found that food-grade (i.e., safe enough to be in contact with food) petroleum grease from Lubrication Engineers, Inc. provided excellent lubrication qualities and resisted washout. Called Quinplex 4024, the grease is rated as a low-hazard material to human health, though complete information on its biodegradability and aquatic toxicity was lacking when it was tested. It performed well at Parker Dam from 1994 to 2000, showing exceptional resistance to washout.

During this period, Parker Dam staff examined information from the Bureau of Reclamation’s Water Resources Research Laboratory (WRRL) in Denver, Colorado, as it also was evaluating several alternative lubricants. WRRL compared five alternative greases against a standard lithi-

Hydroelectric Power Plants 101

A hydroelectric plant passes water through a series of louvers, called “wicket gates,” to a turbine that powers an electric generator. Opening and closing the wicket gates regulates the flow of water to the turbine. Greases lubricate the wicket gate bushings [see illustration]. These greases must function under difficult-use conditions, including frequent opening and closing of the wicket gates and high pressures on the bushings. The greases also must provide sufficient protection to maximize the service life of the wicket gate bushings.



Power Facilities

um-petroleum grease. The five greases tested included three food-grade petroleum greases similar to the grease used at Parker Dam, a synthetic ester-based grease, and a canola-based grease.

The tests were performed on a scale model of a prototype wicket gate at the Mt. Elbert Power Plant near Leadville, Colorado. The model gate operated under conditions that simulated the most severe duty cycle experienced by a wicket gate. WRRL determined lubrication efficiency by measuring the friction torque during gate opening and closing. The performance of the lithium-based grease was defined as a good lubrication rating of 100 percent.

Synthetic ester-based and canola-based greases, with lubrication ratings of 93 percent and 105 percent, respectively, performed much better than the food-grade petroleum greases in these tests. The average rating for the three food-grade greases was 55 percent. Environmental data on these and similar lubricants are available from manufacturers. After analyzing its performance under extreme-wear conditions, WRRL recommended that Parker Dam switch to a canola-based wicket gate lubricant.

Parker Dam switched to a canola-based grease—Cor-Tek VSG—made by Utility Service Associates in 2000, and staff at the dam are satisfied with the performance of this grease, although some are concerned that VSG's apparently higher washout factor could compromise its superior wear characteristics. Utility Service Associates reports that other facilities using VSG are using less grease, indicating greater



resistance to washout. A more complete understanding of washout performance under various use conditions would provide valuable information to potential users of VSG and similar products.

Data on biodegradability and aquatic toxicity supplied by Utility Service Associates show VSG's environmentally preferable characteristics:

- VSG demonstrated more than 80 percent biodegradation in a 21-day test (meeting the German Blue Angel eco-label criteria for "ready biodegradability").
- VSG was virtually non-toxic to rainbow trout and *Daphnia magna* (a water flea), with a 96-hr LC50 value in trout of greater than 93cc/l and a 48-hr LC50 in *Daphnia* of greater than 1,000 ppm.

For more information, contact Jim Darr of EPA at 202 564-8841 or <darr.james@epa.gov>. Details of the studies done by the Bureau of Reclamation are at <www.usbr.gov/wrl>.



Calling All Private Sector EPP Pioneers!

**Don't let your EPP efforts go unnoticed—
tell your success story in a new EPA report!**

Due to the popularity of the June 1999 report, *Private Sector Pioneers*, available on the Web at www.epa.gov/oppt/epp/pdfs/privsect.pdf, EPA's EPP Program is collecting information for a new report highlighting the efforts of companies to "buy green" and "sell green." The 1999 report showed how 18 companies were expanding the market for green products, preventing tremendous amounts of pollution, and saving millions of dollars, all as a result of considering the environment, along with price and performance, when making purchasing decisions.

Great strides have occurred in the last 2½ years, so we are excited to hear how you are contributing to the green purchasing trend. If you are interested in sharing your EPP experiences, please contact the EPP Program at pilot.epp@epa.gov.



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EPP Update

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ENVIRONMENTALLY PREFERABLE PURCHASING

Carpet Products and the Environment: Don't Sweep the Issues Under the Rug

Carpet is quiet, soft, slip-resistant, and often quite beautiful. These qualities make it an extremely common choice as a floor covering for office space. But carpet is also a problem for solid waste management programs around the country and contributes to concerns about poor indoor environmental quality. By considering a variety of lifecycle attributes, from the materials used to manufacture and install carpet to recycling and disposal issues, purchasers can make informed decisions about carpet options.

Key Health and Environmental Issues Associated With Carpet

Health and environmental concerns associated with carpet include indoor air quality, toxic chemical emissions from manufacturing and disposal operations,

and solid waste impacts. A variety of volatile organic compounds (VOCs) can be emitted from carpet materials. For example, 4-phenylcyclohexene has a very low odor threshold and has been associated with indoor air quality complaints after new carpet is installed. Other compounds emitted from carpet, such as formaldehyde and styrene, can present acute or chronic health concerns under certain exposure conditions. The manufacture and disposal by incineration of polyvinyl chloride, a common component of carpet backing, is a source of dioxin contamination in the environment. Dioxin is a potent carcinogen that is highly persistent in the environment and bioaccumulates through the food chain. About 4 billion pounds of carpet enter the solid waste stream in the United States each year, accounting for

< Continued on Page 6 >

Highlights

- Paper Sets the Standard
- WasteWise Update delivers EPP Theme
- King County Annual Report
- Sharing Responsibility for Sustainability
- New Eco-Labels Web Site
- Green Conferences
- Arizona National Guard Eco-Building
- EPP Database

PROFILE OF A PIONEER:

Wanted: Good Home for Excess Supplies

Need some laboratory glassware, file folders, or a lamp for your office? Before they purchase any of these items, employees at the U.S. Geological Survey's (USGS) campus in Menlo Park, California, have learned to first check the stock at the "Supply Exchange."

Spearheaded by Susan (Sue) Hunt, a logistics management specialist at USGS's Redwood City Marine Facility, the

Supply Exchange is a place where employees can drop off and pick up unwanted, but still usable, office, field, and laboratory supplies. Sue



< Continued on Page 3 >

Paper Sets the Standard

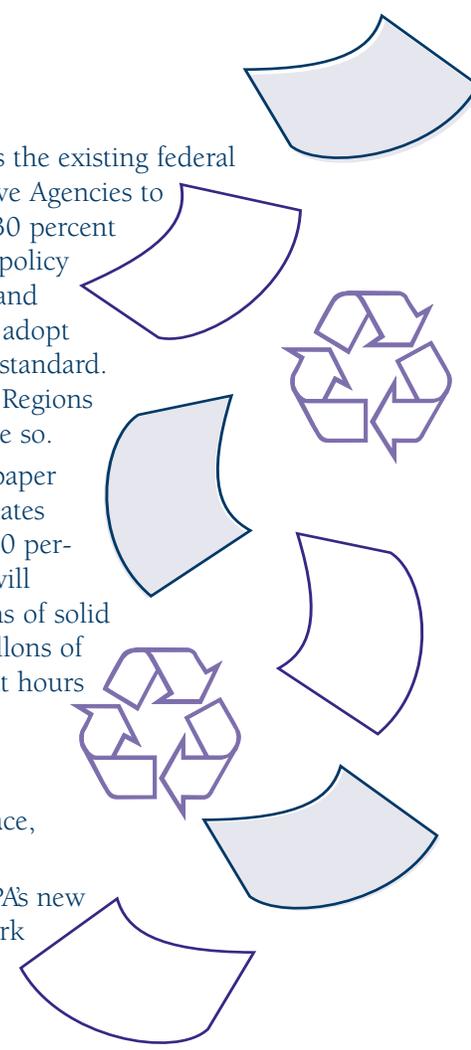
As many of our readers are aware, with each new issue, the *EPP Update* highlights a different type of paper determined by EPA to have certain positive environmental attributes. We are using this issue to highlight EPA's new paper standard for EPA publications and photocopiers—making it easier for everyone at EPA Headquarters (HQ) to print “green.” The new policy requires that paper used at HQ contain at least 50 percent postconsumer fiber and be bleached without the use of chlorine or chlorine-containing compounds whenever possible.

To ensure adherence to the new policy, EPA changed two of its direct-deal contracts with the Government Printing Office (GPO) to incorporate requirements for the new specifications. Due to availability issues with colored stock, the requirements apply only to white cover and text stocks. For one-time bids through GPO, EPA specifies the recycled content levels required by the new policy and encourages the use of process chlorine free paper, if available to meet the requested schedule. Therefore, although the paper used for this *EPP Update* is processed chlorine free, all EPA publications cannot be assumed to be.

EPA's new policy strengthens the existing federal standard requiring all Executive Agencies to use paper containing at least 30 percent postconsumer fiber. The new policy also encourages EPA Regions and other government agencies to adopt the 50 percent postconsumer standard. Some EPA Regions, including Regions 3, 4, and 10, have already done so.

Based on typical EPA copy paper usage and printing, EPA estimates that annual savings over the 30 percent postconsumer standard will equate to eliminating 71.7 tons of solid waste, conserving 157,872 gallons of water, saving 205,920 kilowatt hours of electricity, preventing the emission of 1,135 pounds of greenhouse gases, saving 396 cubic yards of landfill space, and saving nearly 1,600 trees.

For more information on EPA's new paper policy, contact Russ Clark at <clark.russell@epa.gov>.

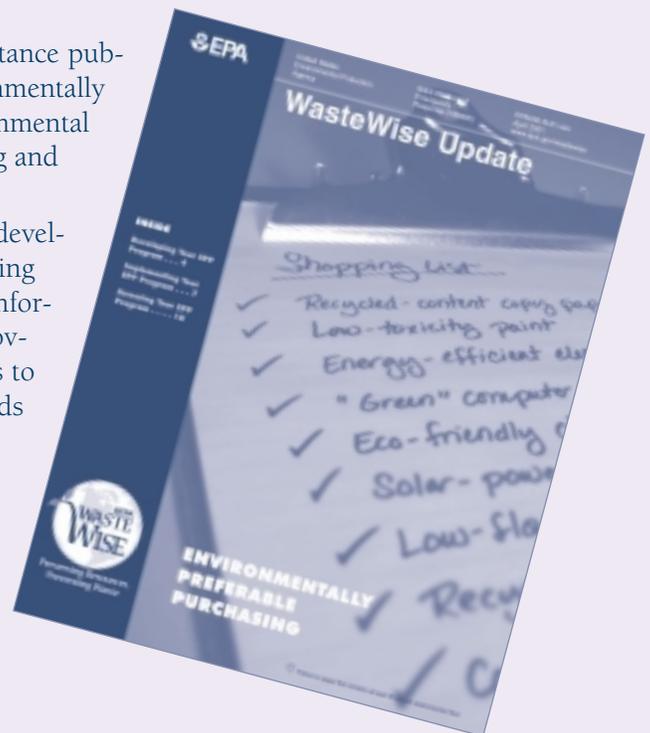


WasteWise Update Delivers EPP Theme

A recent issue of EPA's *WasteWise Update*, a technical assistance publication focusing on waste reduction, highlights environmentally preferable purchasing. The *Update* discusses the environmental and business benefits of environmentally preferable purchasing and provides guidance on setting up a green purchasing program.

WasteWise partners' success stories support suggestions for developing, implementing, and assessing an environmental purchasing program. To appeal to a larger audience, the *Update* presents information and examples that are useful to both businesses and government agencies. An extensive list of resources directs readers to additional sources of information on green purchasing standards and initiatives.

To obtain a copy of the *Update*, call the WasteWise Helpline at 800 EPA-WISE, or visit the WasteWise Web site at <www.epa.gov/wastewise>.



King County Reports EPP Successes

King County, Washington's Environmental Purchasing Program has had 9 years of success, spending \$3.5 million for environmentally preferable products and saving \$575,000. The county publishes an annual report that contains information about its EPP program, including implementation, challenges, and opportunities. The report also contains information about specific products that the county purchases each year and how its purchasing decisions lead to financial savings. For example, the Renton Maintenance Facility in King County is using recycled plastic sideboards for their dump trucks rather than the traditional wood sideboards. The plastic

sideboards are more impact-resistant and need replacing less frequently, which saves money in the long-term. Though the recycled plastic sideboards have a higher initial cost, replacement of the sideboards has been reduced from two wooden sideboards per week to fewer than one plastic sideboard per month, saving the county \$5,000 per year.

"The central message of the report is that users are making this success happen," says Eric Nelson, King County's EPP Program Coordinator. "The report shows that successful environmental purchasing is an incremental process—we haven't had any major breakthroughs but have seen

many small successes."

The 2000 annual report is available online at <www.metrokc.gov/procure/green>. For more information about the program and report, contact Eric Nelson at <eric.nelson@metrokc.gov> or 206 263-4278, or Karen Hamilton at <karen.hamilton@metrokc.gov> or 206 263-4279.



Pioneer < Continued from Page 1 >

explains that the Supply Exchange program, which is free to all participants, is an important part of the campus culture, saving both landfill space and trash collection fees, reducing procurement costs, and conserving government resources. Recently, the Supply Exchange received a White House Closing the Circle Award in recognition of its recycling and reuse accomplishments.

Sue and a group of colleagues were inspired by activities that they participated in during the 1990 Earth Day commemoration. The extensive USGS recycling program evolved from there, and in 1996, when the first of many office relocations began, the Supply Exchange was born. Since then, Sue has had to contend with several relocations of the Supply Exchange itself, because

the dedicated space required to make the program work is increasingly hard to come by on an ever-shrinking campus. However, she acknowledges that her efforts, which are above and beyond her normal job responsibilities, are well worth it when she sees the results. "It is satisfying," Sue says, "when someone tells me that they discovered something they really needed at the Supply Exchange. One lab manager said he picked up \$5,000 in laboratory glassware in one trip alone!"

Although the Supply Exchange does not accept furniture items or electronic equipment, Sue works with the agency property office to donate surplus office furniture and computers directly to schools that desperately need them. In addition, items that are no longer

in demand by USGS employees are made available to local schools and nonprofit organizations.

Sue, a 27-year veteran of USGS, grew up in Tucson, Arizona, and says she has always had a passion for not wasting things. A confessed pack rat, she also is an avid birder and native-plant gardener. In addition to the Supply Exchange, Sue has spearheaded several related efforts, including a program to collect items such as photographic negatives, blueprints, foam packaging, and ink cartridges, which are typically not collected as part of most office recycling programs.

For more information on the USGS Supply Exchange, contact Sue at 650 329-5860 or <shunt@usgs.gov>.

Sharing Responsibility for Sustainability

FNS Member Organizations:

- Navy
- Air Force
- Army
- Environmental Protection Agency
- Department of Energy
- National Park Service
- General Services Administration
- Bonneville Power Administration
- National Aeronautics and Space Administration

Recent energy shortages in the Western United States highlight the need for meaningful cooperation among federal government agencies in the areas of planning, purchasing, and managing valuable resources. The Federal Network for Sustainability (FNS), a voluntary group of representatives from several western federal agencies, aims to promote this type of interagency collaboration.

Sustainability—which means meeting current social, economic, and environmental needs without compromising the ability of future generations to do the same—has become a guiding principle in planning and operating strategies for many businesses, institutions, and governmental organizations. FNS capitalizes on the experiences and resources of its member agencies to efficiently implement sustainable practices in their regions.

On Earth Day 2000, 11 federal officials representing 6 government agencies in western regions signed a Statement of Unity, pledging to coordinate federal leadership efforts on sustainability and to demonstrate sustainable practices within the federal government. The officials formed FNS as an outgrowth of this signing ceremony to provide an operational focus for sustainability projects and programs, including environmental initiatives, resource conservation, and green purchasing, both within and among the signatory agencies.

Currently, FNS focuses on three goals: expanding the market power of “green” government purchasing, increasing the use of renewable energy sources, and developing and using environmental

management systems, which help businesses incorporate environmental management into everyday practices. After just 1 year, FNS touts several accomplishments in these areas. For instance, two green power summits were held in San Diego and Seattle, where more than 300 federal and utility sector participants learned about renewable energy resources and mechanisms for developing or purchasing these resources in a financially conscious manner. FNS also is reassessing purchasing specifications for recycled paper and electronic equipment to boost the market for these products.



The way FNS operates is effective. First of all, leveraging the expertise and resources of several western federal agencies maximizes taxpayer dollars. In addition, FNS members incorporate sustainability activities into their everyday work responsibilities, and in the end, each agency benefits from pooling resources. Voluntary participation ensures motivated, productive members, committed to pollution prevention and long-term sustainability. “Because of FNS,” says EPA’s Barbara Lither, “we don’t have to reinvent the wheel when we want to buy green power or research a green product.” FNS member agencies can provide support based on their past experiences, which, according to Curtis Framel of the Department of Energy, ensures efficiency and a “streamlined approach to sustainability that avoids duplication.”

For more information or to become a member of FNS, please visit www.federalsustainability.org or contact FNS Chair Alan Hurt at 619 524-6253.

How Well Do You Know Your Labels?

Do you know what it means when a product claims to be “organic” or “environmentally friendly?” Moreover, who monitors companies’ claims? A new “eco-labels” Web site helps consumers decipher labels on food and wood products so they can make more informed decisions about the products they buy.

Developed by the Consumers Union, the publisher of Consumer Reports magazine, the eco-labels site provides users with information about the products on which the eco-labels are used and the organizations and standards behind each label’s environmental claims.

Users can search the database three different ways—by label, product, or certifier—and are given a list of the associated eco-labels. For example, selecting “Sustainable Wood” in the label search box identifies three labels found on products claiming to use sustainable wood. Clicking on the specific label brings the user to a page of detailed information, including a program description, how a particular product qualifies to carry that label, and a

Consumer’s Union evaluation assessing the quality of the labeling program. The site also provides contact information for organizations and a list of products carrying that label.

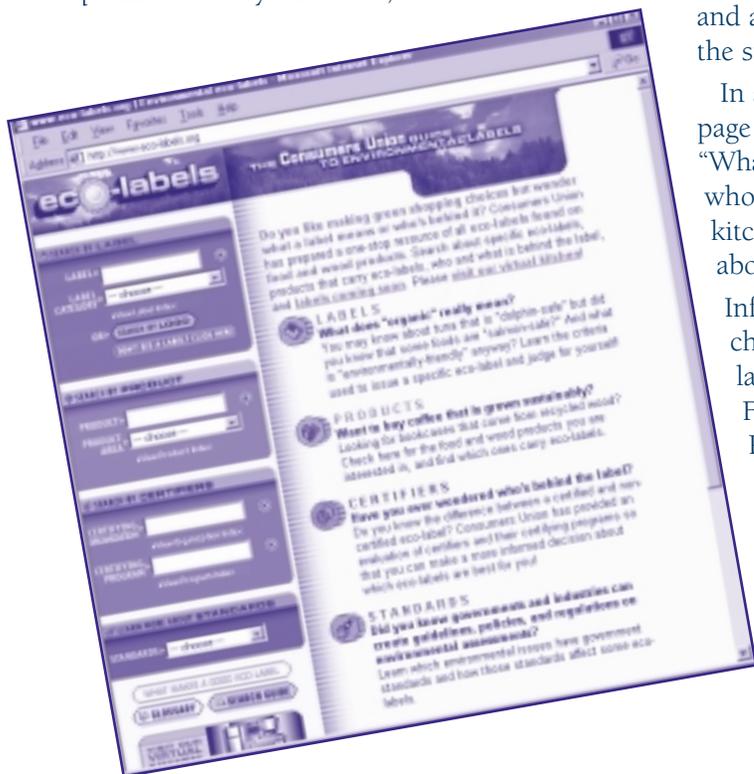
Searching by product provides users with another way to sort and access the information on eco-labels.

For example, entering “coffee” in the product search box identifies five different labels found on coffee. Each label represents a different positive environmental attribute, such as organic, bird-friendly, and social responsibility. The user can then access the same detailed information mentioned above. The site does not, however, evaluate specific product brands. Users also can search for a certifying organization or program, such as Rainforest Alliance, Green Seal, or the Department of Agriculture, and access information on standards at both the state and federal level.

In addition, the site provides a glossary and a page describing the criteria used to evaluate “What Makes a Good Eco-Label.” For users who like interactive learning, the virtual kitchen provides pop-up style information about food, wood, paper, and coffee products.

Information is still being added to the site, so check back often. You can visit the eco-labels Web site at <www.eco-labels.org>.

For additional information, contact Irvashi Rangan at 914 378-2351.



Carpet Products and the Environment

< Continued from Page 1 >

more than 1 percent by weight and about 2 percent by volume of all municipal solid waste. Furthermore, the bulky nature of carpet creates collection and handling problems for solid waste operations, and the variety of materials present in carpet makes it difficult to recycle.

Consideration of the Entire Life Cycle and Trade-off Issues is Important

Significant impacts can occur throughout the life cycle of carpet, and these impacts vary with the types of materials used, the pattern of carpet use and replacement, and the options available for reuse, recycling, or disposal. An approach for evaluating the lifecycle impacts of carpet and other floor coverings is included in the Building for Environmental and Economic Sustainability (BEES) tool, which can be downloaded from <www.epa.gov/oppt/epp/bees.htm>. BEES includes lifecycle impact data on nylon and recycled polyethylene terephthalate (PET) carpet. General information on lifecycle analysis and its role in environmentally preferable purchasing can be found in the EPP General Training Tool at <www.epa.gov/oppt/epp/gentt/>.

Nylon is the most popular fiber used in commercial carpet facing. Two closely related forms of nylon—“nylon 6” and “nylon 6,6”—are used in carpet facing. Recycled nylon 6 is available and is used by some manufacturers. Currently, there are no commercial sources of recycled nylon 6,6. Some manufacturers believe that nylon 6,6 provides better performance for certain characteristics such as stain resistance. Polypropylene and PET are also used in carpet face fiber. Recycled PET is widely available, but carpet made with PET face fiber is not as durable as nylon or polypropylene carpet and is usually recommended only for light to moderate wear conditions.

Carpet fibers can be “solution dyed” by the fiber manufacturer or dyed later at the carpet mill as the carpet is manufactured. Some believe that solution dyeing during fiber manufacture results in lower emissions and better color fastness than subsequent dyeing at the carpet mill. However, the differences between solution dyeing and mill dyeing depend highly on the particular processes used, and it is difficult to generalize about the advantages of one process versus the other.

Carpet backing is used to provide structural support to the face fiber. The primary materials used in carpet backing are jute, polypropylene, polyvinyl chloride (PVC), and polyurethane. Jute is a renewable biobased product but is not as durable as the

synthetic backings. Recycled-content (up to 100 percent) PVC backing is available, but dioxin and other chlorinated byproducts are formed during the manufacture and disposal (by incineration) of PVC.

Polypropylene avoids the chlorinated byproduct issues of PVC, but its manufacture requires more energy than PVC does, and recycled-content polypropylene backing is not readily available. A new polyurethane backing under development uses a polyol derived from soybean oil. In addition to the renewable resource advantage, it appears that soy-based polyurethane requires less energy during the curing step than polyurethane made from standard petroleum-based polyols.

Carpet cushion is placed underneath the carpet to provide additional comfort, insulation, and noise reduction. In some cases, the cushion is integrated with the backing. Materials commonly used in carpet cushion include polyurethane, jute, synthetic rubber, PVC, and other synthetic fibers. All of these substances can be obtained from recovered materials.

Because of its complex nature (typically at least three different materials bonded together), carpet is difficult to recycle. However, some manufacturers do have programs to collect used carpet for materials recovery and subsequent processing into a variety of products. Most of the carpet in the United States that is recycled is separated and processed into new products in Georgia by the DuPont Carpet Reclamation Program (800 4DUPONT). A few other carpet manufacturers incorporate postconsumer materials in their carpet. A description of recycling activities within the carpet industry can be found on the Carpet and Rug Institute’s (CRI’s) Web site at <www.carpet-rug.com>.

VOCs can be emitted from any or all carpet components, as well as from adhesives that are sometimes used during carpet installation. Field or laboratory testing is needed to identify and quantify the compounds emitted. Currently, it is not possible to predict the identities and quantities of these emissions based solely on the chemical composition of the materials used in the carpet.

The Choice is Yours

Environmentally preferable carpet choices each have their own merits, and choosing one depends on the specific need, location, and use for the carpet. Some questions to consider in determining the best choice for your situation include:

- **What are the durability requirements?**

Because increasing the durability of carpet generally requires a more resource-intensive manufacturing process and makes use of recycled material difficult, it is important to anticipate the expected use pattern and replacement schedule in order to make the best environmental purchase. For example, don't specify the most durable carpet for a temporary space with light use and frequent change in tenants and, therefore, frequent renovations and flooring replacement.

- **Tiles or broadloom?**

Tiles use more material initially because of the need for a thicker backing but, depending on the use pattern, they can save materials in the long run because worn or soiled tiles can be replaced individually rather than replacing the entire carpet. Also, keep in mind that broadloom carpet comes in standard widths—typically 6 and 12 feet. Because tiles are smaller, less carpet is wasted when tiles are installed in spaces with different dimensions.

- **What is the recycled content of the carpet face fiber, backing, and cushion?**

- **Is there a mechanism for recycling some or all of the carpet components?**

- **What are the chemical emissions from the manufacture and disposal of carpet materials?**

- **What are the emissions from the carpet itself or from other materials used during its installation (e.g., adhesives)? Do any of these emissions present indoor air quality concerns?**

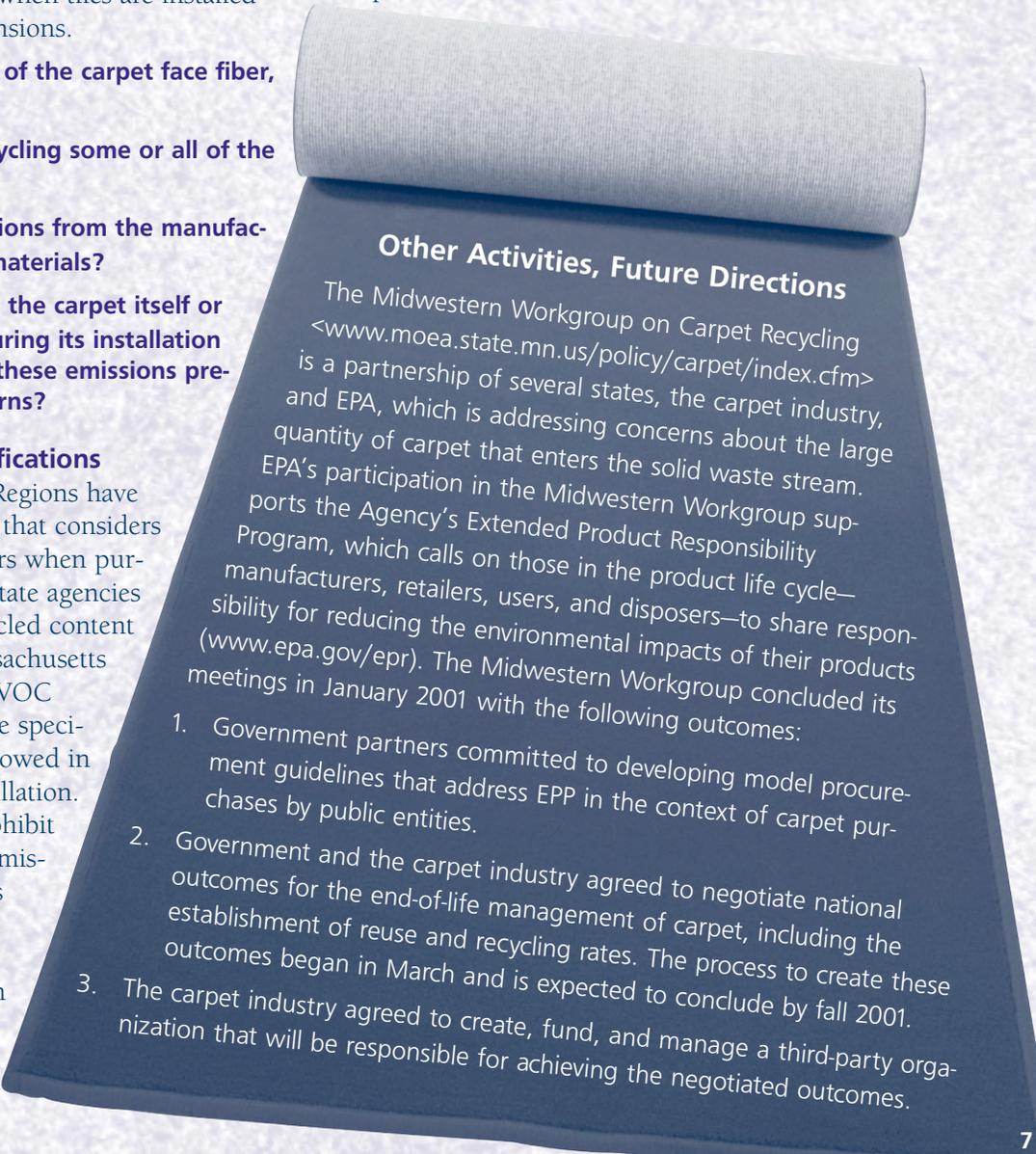
Carpet Standards and Specifications

A number of states and EPA Regions have incorporated contract language that considers health and environmental factors when purchasing carpet. Massachusetts state agencies specify minimum levels of recycled content for carpet purchases; both Massachusetts and Minnesota allow only low-VOC adhesives; and Washington state specifies the maximum emissions allowed in the first 30 days following installation. EPA Region 7 specifications prohibit certain chemicals and require emissions to meet standards of CRI's "Green Label" program, which encourages manufacturers to reduce chemical emissions from carpet products. Region 10 allows only low-VOC and formaldehyde-free adhesives

and requires that any carpet unable to be reused must be recycled with the Dupont Carpet Reclamation Program or its equivalent.

EPA also is exploring the development of voluntary consensus standards, which would incorporate environmental factors into the product design and manufacturing process. In addition, under EPA's Comprehensive Procurement Guidelines (CPG), federal agencies are required to purchase carpet and carpet cushion, among other items, with recovered content. The CPG currently addresses only polyester carpet, but EPA is considering adding a requirement for nylon carpet and nylon carpet backing.

Purchasers can find contract language and other voluntary standards for carpet in the EPP Database at <www.epa.gov/oppt/epp/database.htm>. For CRI's Green Label Emissions Limits and additional carpet resources, go to <www.epa.gov/oppt/epp/carpetresources.htm>.



Other Activities, Future Directions

The Midwestern Workgroup on Carpet Recycling <www.moea.state.mn.us/policy/carpet/index.cfm> is a partnership of several states, the carpet industry, and EPA, which is addressing concerns about the large quantity of carpet that enters the solid waste stream. EPA's participation in the Midwestern Workgroup supports the Agency's Extended Product Responsibility Program, which calls on those in the product life cycle—manufacturers, retailers, users, and disposers—to share responsibility for reducing the environmental impacts of their products (<www.epa.gov/epr>). The Midwestern Workgroup concluded its meetings in January 2001 with the following outcomes:

1. Government partners committed to developing model procurement guidelines that address EPP in the context of carpet purchases by public entities.
2. Government and the carpet industry agreed to negotiate national outcomes for the end-of-life management of carpet, including the establishment of reuse and recycling rates. The process to create these outcomes began in March and is expected to conclude by fall 2001.
3. The carpet industry agreed to create, fund, and manage a third-party organization that will be responsible for achieving the negotiated outcomes.

Save Money and the Environ

[EPA has recently begun updating and expanding its green conferences/green meetings Web site, so keep checking it out at <www.epa.gov/oppt/greenmeetings>!]

Don't be left behind—more and more people are adopting the “green meetings” concept when planning events and conferences. Although some might view green meetings as a fad, current initiatives that are under way are proof to the contrary. Before going any further, however, it is important to identify what exactly a green meeting is, the environmental impacts of holding a meeting, and how to minimize those impacts. Then, this article profiles organizations that are helping develop the green meetings market, and shows how coordinated and collaborative this type of work is.

What makes a meeting green?

Bringing people together for meetings, often for multiple days at a time, can create a variety of environmental impacts—from the smog and greenhouse gas emissions associated with air and ground travel to the paper, plastic, and food waste associated with feeding attendees. Fortunately, however, more and more meeting planners are realizing that they can reduce these impacts and save money in the process, without sacrificing the quality of the attendees' experience.

The Oceans Blue Foundation, a Canadian coastal conservation group, defines green meetings as “an assembly or gathering of people for the purpose of the exchange of information, where, through careful planning, negative impact on the environment is minimized.” In the early 1990s, a green meeting might have meant that brochures were printed on recycled-content paper or that soda cans were collected for recycling. The costs associated with even these simple steps were often prohibitive for most meeting planners and

meeting service suppliers. Today, however, the opportunities to organize green meetings and events are almost limitless—often offering ways to save money and increase efficiency.

What can be done to minimize the impacts?

Depending on the size of a conference, incorporating environmentally responsible decisions into meeting planning can begin months, even years in advance. Start by carefully choosing the city and conference site that offers the most environmental advantages. This can be the most critical step in laying the groundwork for either a green or brown meeting. Other opportunities to reduce meeting-related impacts on the environment can be divided into six categories. The following lays out a few steps in each category:

Accommodations

- Choose a hotel that has energy and water conservation programs, including automatic controls for the HVAC system; fluorescent lighting and automatic lighting controls; low-flow taps, showerheads, and toilets; and gray water initiatives (the recycling and reuse of unpurified water).
- Give hotel guests the option to reuse towels and sheets.

Transportation

- To minimize vehicle emissions, plan a meeting so as to maximize the ability to reach meeting locations, accommodations, area restaurants, attractions, and the airport via mass transportation or by walking.

Food and Beverage

- Plan menus around abundant, locally produced ingredients and avoid threatened species.
- When possible, all surplus food should be donated to local shelters and food banks.
- Consider providing drinking water in pitchers or large reusable containers instead of small plastic bottles.

Meeting Facilities

- Look for facilities that invite meeting attendees to share in energy conservation and the waste reduction process—for example, by reducing paper towel use, supporting use of soap dispensers vs. individual soaps, avoiding waste, and participating in recycling programs that utilize visible signage



brochures were printed on recycled-content paper or that soda cans were collected for recycling. The costs associated with even these simple steps were often prohibitive for most meeting planners and



ment by Meeting Green

informing attendees on what is and is not recyclable.

Exhibits

- Use signage and evaluation bins that are reusable whenever possible.
- Discourage exhibitors from bringing to the show large quantities of excess materials, which often end up in the trash because exhibitors don't want to ship the excess back at the show's conclusion. Encourage exhibitors instead to refer clients to their Web site. Also, useful environmentally responsible gifts are preferable to items that will be discarded at the end of the show.

General Office Practices and Communications

- Take advantage of or promote the use of electronic communication, registration, and proceedings distribution.
- Use double-sided copies.

Who is working to green meetings?

Europe and Canada are far ahead of the United States when it comes to planning green meetings or providing green meeting services such as transportation, food and beverage, or lodging. For example, Fairmont Hotels, formerly Canadian Pacific Hotels, has created its own Eco-Meet program. There is an ever-increasing number of green meeting “pioneers” in the United States, but many meeting planners are still having a difficult time finding green services for their meeting. This is why it is important to remember that asking for green is key. It is the first step toward showing that there is a demand for reduced environmental impacts associated with a meeting. For example, when enough meeting planners ask for reusable mugs, nontoxic cleaning services, or energy-efficient lighting, then hotels, convention centers, and meeting service providers will begin to respond.

Several organizations have undertaken efforts to promote green meetings.

The U.S. Environmental Protection Agency's Green Conference Initiative

<www.epa.gov/oppt/greenmeetings>

The goal of this initiative is to develop a “one-stop shopping” location at which meeting planners and service providers can learn about green meetings.

The information is meant to help planners request, and help suppliers provide, green options for meeting planning. The Web site includes the following: a checklist of opportunities that minimize the environmental impacts of holding meetings; contract language for obtaining greener conference planning/support services; and links to information on other related initiatives.

Oceans Blue Foundation

<www.oceansblue.org>

Oceans Blue Foundation (OBF) is a Canadian environmental charity that was created in 1996 to help conserve coastal environments through environmentally responsible tourism. It is the first organization in North America to focus on developing and promoting best practices and standards for all sectors of the tourism industry, as well as the first to develop guidelines for green meetings. OBF will be leading an effort that will involve working with EPA and other stakeholders to develop a Web-based tool to help meeting planners plan green meetings.

The Coalition for Environmentally Responsible Economies (CERES) Green Hotel Initiative

<www.ceres.org/about/Programs/ghoverview.html>

The Green Hotel Initiative seeks to increase green lodging and meeting options by catalyzing market supply and demand. This multi-stakeholder effort—involving business, the hotel industry, nongovernmental organizations, labor, academia, and environmental advocates—promotes environmentally responsible hotel services and encourages meeting

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Meetings Facts and Figures

- Approximately 93,000 federal travelers are traveling to 8,000 locations across the country on any given business day.
- Federal travelers use 24 million room nights of hotel space in the United States annually.
- An average hotel purchases more products in a week than 100 families purchase in an entire year.
- Travel and tourism is now the world's largest industry. Meetings make up a growing component of this industry, which weighed in a few years ago at \$280 billion annually, worldwide.

Greening the Guard in Arizona

Shattering the myth that green buildings cost more, this extraordinary building cost the Arizona National Guard only half of what a conventionally constructed office building would have. How did they do that? Creative use of reclaimed materials salvaged from buildings slated for demolition and inmate labor provided through a partnership with the Maricopa County Sheriff's office.

In an innovative project, the Arizona Army National Guard is making sustainable building practices a reality. The National Guard constructed a fully self-sustaining office building using recovered materials and energy-efficient practices that will serve to educate the public about sustainability. Walls made of scrap tires and compacted earth, a passive cooling design, a photovoltaic system to generate power, and a number of other features make the National Guard's new "Eco-Building" a showcase facility for other organizations.

The walls of the 5,200-square-foot facility are made from approximately 4,500 tires, weighing 300 pounds each when packed with dirt. The tires are stacked like bricks and packed with dirt. In addition to diverting tires from stockpiling or disposal, the tire walls store heat in the winter and absorb heat during the summer, reducing the amount of energy required to regulate the building's temperature. "Cool tubes" also were installed to cool the building during summer. These tubes are large pipes buried 10 feet below the building. Air is brought into the tubes through an external shaded opening and is cooled by the temperature of the earth. Cooled air is pulled into the building through the cool tubes when the air in the building gets hot and rises. Heating is not required due to the internal energy load from people, computers, and printers, as well as by strategic window placement.

With its energy and water systems, the building operates independently from utility companies. The Eco-Building gets all of its energy from a photovoltaic power system. The main sources of lighting are windows, six energy-efficient skylights, and solar tubes. The roof captures rainwater and funnels it into cisterns that supply water for drinking, bathroom sinks, and toilets. Water is heated by a solar hot water system, and all the water is supplied to the building with solar-powered pumps. Gray water, captured from the sinks, is filtered and used for watering the garden.

In recognition of its unique design and construction, the Eco-Building received the 2000 Arizona Governor's Environmental Leadership Award. "The construction concepts and principles used for this building are not revolutionary in and of themselves—what is revolutionary is the willingness of this organization and the innovative approaches it has taken to embrace environmental sustainability," said T.J. Roe, Eco-Building project manager. The National Guard was able to build the Eco-Building at half the cost of a conventionally constructed office building. The organization achieved cost savings by using reclaimed materials salvaged from buildings slated for demolition and inmate labor provided through a partnership with the Maricopa County Sheriff's Office. This partnership provided valuable technical skills to the inmates while minimizing construction costs, Roe said.

Photos and information about the Eco-Building are available at www.azecobuilding.com. For more information about the project, contact T.J. Roe at 602 267-2663 or tj.roe@az.ng.army.mil.



Worker preparing for placement of the final layer of dirt.

EPP Database Continues to Expand and Evolve

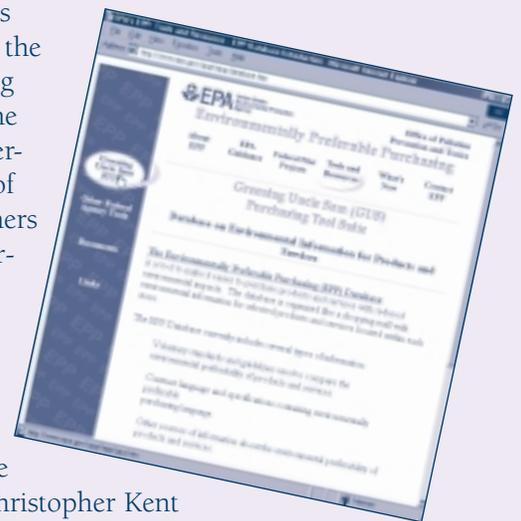
Whether you're looking to purchase a new fleet of energy-efficient vehicles or a less hazardous bathroom cleaner, EPA's EPP database <www.epa.gov/oppt/epp/database.htm> is your one-stop shop. For almost a year, the database has provided environmental information about a wide variety of consumer products. Users can search the database of more than 600 products—from computers and home electronics to toothbrushes and toilet tissue—in a “shopping mall” format by browsing a “store” or searching for a specific product.

The EPP database currently contains 10 speciality stores, including Furniture/Appliances, Computers, Hardware, Industrial Products and Services, Scientific/Medical, and Grocery/Miscellaneous. For more convenient “shopping,” the stores are further divided into “aisles.” For example, the “grocery store” is divided into aisles for cleaning supplies, food, toiletries, and pet products. Other stores may be added as the demand for information on a given product increases.

Several government agencies, as well as private sector groups and organizations, originally compiled the information in the database. The database contains a wealth of information, including the contract language created and used by federal and state governments to buy environmentally preferable products and services. It also provides the environmental standards and guidelines for certain products, as well as vendor lists of product brands that meet these standards.

To ensure that the database is meeting the needs of its users, the EPP program is actively seeking input from users to enhance the database and make it more user-friendly. Because the purpose of the database is to help consumers identify environmentally preferable products, EPP wants to ensure that it is including the most relevant information in a useful format.

Anyone with comments or suggestions on how to improve the database should contact Christopher Kent at <kent.christopher@epa.gov>.



Tires and dirt are used to construct the conference room walls.

The Eco-Building is a showcase facility for demonstrating:

- Sustainability
- Use of unwanted and waste materials
- Partnerships
- Energy efficiency and solar energy
- Costs and benefits of constructing self-sustaining office buildings

Green Meetings

< Continued from Page 9 >

planners and travel buyers to stimulate the hotel market.

Meeting Professionals International (MPI)— Green Meeting Task Force

<www.mpiweb.org>

In October 1997, Meeting Professionals International's Board of Directors authorized the creation of a task force on green meetings. The task force developed a white paper to address options for planning green conferences. Information includes recommendations to MPI planner members and MPI supplier members on how they can make their services and products more environmentally responsible. It also provides specific recommendations to MPI on how to make its own meetings more environmentally responsible.



Fairmont Hotels Eco-Meet Program

<www.cphotels.ca>

Fairmont Hotels (previously Canadian Pacific), the largest hotel company in Canada, has developed an environmental program, which is recognized as the most comprehensive in the North American hotel industry. Fairmont Hotels offers conference planners a “ready-made” green conference package called Eco-Meet.

Look for more details on these initiatives and for information on many other initiatives and activities focused on greening meetings and hotels at

<www.epa.gov/oppt/greenmeetings>. The descriptions can be found under the “Current Initiatives” button.

For more information on green meetings, contact Russ Clark of EPA at <clark.russell@epa.gov>.



United States
Environmental Protection Agency
(7409)
Washington, DC 20460

Official Business
Penalty for Private Use \$300



Federal Pioneers:

Environmentally Preferable Purchasing Success Stories From the Federal Government



“ **We, as government employees, have a responsibility to the American public**

as custodians of their interests to do what is in their best interest. This includes making informed decisions in our procurement practices about what products and practices reduce impacts on the environment and human health...**The entire environmentally-preferable purchasing process has been an epiphany for me.** I am much more sensitive about how my individual decisions effect the environment. I'm also a much more informed consumer.

—Robert Cox, Chief of the Pentagon Technical Staff,
U.S. Department of Defense

“ We bought a large, complex product composed of many components—a new facility. Rather than just looking at individual parts, we also considered the environmental performance of the total package. **In many cases, we found that greener approaches could actually save money**

—like making concrete at the site, saving 10,000 gallons of fuel while cutting the cost of construction. In other instances, we paid for environmental features by limiting costs in other areas—like eliminating extra doors to pay for daylight dimmers and motion sensors for lights. **I have found that green building products, with recycled content or low toxicity, are readily available.** Often, there is no difference in cost and it's simply a matter of asking.

—Chris Long, Chief of the Facilities Development Staff,
U.S. Environmental Protection Agency



Introduction

The federal government purchases more than \$200 billion worth of goods and services each year. Recognizing that purchasing decisions can have important environmental consequences, federal agencies are considering some environmental impacts when buying goods and services. As mandated in Executive Order (EO) 13101, *Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition*, the U.S. Environmental Protection Agency (EPA) has developed guidance on environmentally preferable purchasing (EPP), outlining principles federal agencies should use to identify products and services that have a reduced effect on human health and the environment. This guidance is available at <http://www.epa.gov/oppt/epp/finalguidance.html>.

EO 13101 and EPA's EPP guidance are making a difference. Environmental performance of products and services is increasingly important to federal purchasers when they decide what to buy.

As EPA's guidance notes, there is no "cookie cutter" formula for successfully applying EPP principles. To demonstrate some of the different ways EPP is being incorporated and to provide models for other federal purchasers, EPA has documented pilot procurement projects undertaken by federal agencies, state and local governments, and the private sector. Included in this booklet are federal government EPP highlights.

Each day, federal government agencies and their employees have opportunities to make EPP decisions, big and small. The pioneering projects described here are just a subset of the EPP activities occurring throughout the federal government. Web site addresses are provided for additional information on each project. Please also visit the EPP Web site at <http://www.epa.gov/oppt/epp> for additional case studies and EPP resources.

Environmentally preferable products are "products and services [that] have a lesser or reduced effect on human health and the environment when compared to other products and services that serve the same purpose." This comparison may consider raw materials acquisition, production, manufacturing, packaging, distribution, reuse, operation, maintenance, or disposal of the product or service.

—Executive Order 13101,
*Greening the Government
Through Waste Prevention,
Recycling, and Federal Acquisition*

Cleaners and Paints

U.S. Department of the Interior

Custodial Services at the Department of the Interior's Washington, DC, Offices

<<http://www.epa.gov/oppt/ppg/case/doicase.htm>>

In November 1998, the U.S. Department of Interior (DOI) issued a request for proposals for custodial services (e.g., window washing, floor stripping, maintaining restroom supplies) in its Washington, DC, headquarters that incorporated "green" language into the scope of services. The 5-year, \$6.28 million contract covers the cleaning of 1.4 million square feet of office space. DOI evaluated the environmental characteristics (e.g., chemical makeup, recycled content) of five categories of cleaning products and recycled-content products such as bathroom tissue, paper towels, toilet seat covers, and trash bags. The contract also addressed health and safety concerns for DOI workers and other building occupants by requiring the cleaning products and supplies to be low toxicity, noncarcinogenic, and biodegradable; to reduce skin, eye, and respiratory irritability; and to contain no unnecessary dyes or fragrances. Environmental preferability considerations accounted for 30 percent of the evaluation score when selecting the new contractor. The solicitation process produced a winning bid that not only was the most environmentally preferable and least expensive of the bids submitted, but came in under the price of the current contract.

Yellowstone National Park and Grand Teton National Park—Environmentally Preferable Cleaning Project

<http://www.epa.gov/region8/conservation_recycling/p2home/greengov/yellowcln/yellowcln.html>

The goal of this project was to assist janitorial staff and supervisors in switching to environmentally preferable cleaning products at Yellowstone and Grand

Teton National Parks. The EPA Region 8 Pollution Prevention Program, the Wyoming Department of Environmental Quality, and the parks hired a contractor to provide leadership, training for the staff, and oversight of the project. The environmentally preferable



cleaning products were tested in a pilot project at Yellowstone, including park facilities at Mammoth and Old Faithful. As the pilot was ending, the project expanded to include all Yellowstone and Grand Teton facilities. With sensitive natural surroundings, reducing toxicity and increasing biodegradability was an important project benefit.

Yellowstone succeeded in decreasing the number of cleaning products it uses from 130 to 15, plus a few additional products for specialized or site-specific needs. While cost savings have not been quantified, supervisors and budget managers believe they are spending less thanks to the simplified procurement process. Supervisors have also noted less sick leave, heightened productivity, and increased morale among cleaning staff thanks to the green products. Products used at the parks also meet the bid specifications for environmentally preferable cleaning products developed and used by the city of Santa Monica, California.

U.S. General Services Administration

Cleaning Products Pilot Project

<<http://www.epa.gov/oppt/epp/cleaner.pdf>> and <<http://www.epa.gov/oppt/epp/cleaners/select>>

The Cleaning Products Pilot Project was a cooperative interagency effort between the U.S. General Services Administration (GSA) and EPA to establish a framework for identifying and comparing commercial cleaning products based on their environmental

Construction

attributes. GSA and EPA identified cleaning products with reduced human health and safety impacts for use in federal buildings. As a result of this project, EPA developed a Web-based tool in which the user decides which attributes are most important and an online “purchasing wizard” identifies products matching the given criteria. This was the first environmentally preferable product pilot project under Executive Order (EO) 12873, a precursor to EO 13101. It demonstrated the feasibility of creating interagency partnerships to green the procurement process.

U.S. Department of Defense

Painting the Town Green—The Aberdeen Proving Ground Paint Pilot Project

<http://www.epa.gov/oppt/epp/paint.pdf>

Aberdeen Proving Ground, a Department of Defense installation in Maryland, initiated a pilot project to reduce the number, volume, and environmental effects of the paints it uses—in particular, their potential for contributing to air pollution. Aberdeen contracted with Green Seal, a nonprofit environmental standards organization, to help identify the relevant environmental attributes. Aberdeen then established environmentally preferable paint standards for the installation, focusing particularly on lower levels of volatile organic compounds and reduced toxicity. Through this project, Aberdeen discovered significant, growing competition in the market for environmentally preferable paints, resulting in a cost savings of \$1.78 per gallon. Added to the avoided hazardous waste disposal costs, Aberdeen is saving \$60,000 annually.

Environmentally Preferable Degreasers

<http://www.apg.army.mil/AP2G/strategies.htm>

Aberdeen Proving Ground also is working with Green Seal to develop standards for degreasers the installation can consider environmentally preferable. The installation’s management strategies encourage purchasers to consider not only hazardous materials and recycled content, but the entire lifecycle impacts of products. When finalized, Aberdeen will use the standards to develop a list of products approved for use on the installation.

U.S. Department of Defense

Defending the Environment at the Department of Defense

<http://www.epa.gov/oppt/epp/envdod.pdf>

More than 35,000 employees work at the Department of Defense’s (DOD’s) Washington, DC, facilities, including the Pentagon. Routine office repairs and renovations are a big undertaking—and a prime opportunity to put EPP principles to work. A 5-year, \$10 million per year contract awarded in 1997 requires the DOD construction contractor to use construction materials and practices DOD considers environmentally preferable. Specifically, the contractor must use products with minimal or recycled-content packaging, water-saving plumbing fixtures, recycled-content steel rods and masonry units, paint with low amounts of volatile organic compounds, and recycled-content building insulation that is manufactured without ozone-depleting blowing agents. The contract did not require changing the traditional purchasing process or performance requirements, which allowed DOD to remain within traditional price and time parameters. The contractor has completed hundreds of jobs, all of which use products meeting DOD’s environmental and performance criteria.



Paving the Road to Success—The Department of Defense’s Parking Lot Repair and Maintenance Contract

<http://www.epa.gov/oppt/epp/eppdod1.pdf>

The Pentagon’s parking lots are turning “green” thanks to an innovative EPP pilot project. In June 1997, DOD awarded a 5-year, \$1 million per year contract to maintain and repair the parking lots and access roads at four Washington, DC, facilities—the Pentagon, the Military Court of Appeals, the Navy Annex, and the Hybla Valley Federal Building. In addition to stipulating that the work must meet price and performance requirements, the contract also promotes the use of products with positive environmental attributes (e.g.,

recycled-content, including recycling old asphalt into new; low levels of volatile organic compounds; limited or restricted use of chemicals). This is done by providing opportunities for the contractor to earn a price differential for identifying and using such products. Price differentials allow the contractor to earn additional money by locating and proposing products with minimal environmental impacts that meet or exceed the baseline environmental attributes identified by DOD. The price differential helps promote the use of products with multiple environmental attributes.

Navy at the Leading Edge of Green Design

[<http://www.buildinggreen.com/news/navy.html>](http://www.buildinggreen.com/news/navy.html)

The Department of the Navy is the first federal agency to require that all facility and infrastructure-related designs incorporate sustainable design principles. The Navy's definition of sustainable design includes increasing energy conservation and efficiency, increasing use of renewable energy resources, reducing or eliminating toxic and harmful substances, utilizing efficient resources and materials, selecting materials and products based on their lifecycle impacts, increasing use of materials and products with recycled content, and recycling construction waste and building materials. At the Washington Navy Yard, sustainable design measures resulted in annual energy savings of \$130,000 and at a bachelor enlisted quarters complex in Illinois, the Navy estimates an annual energy savings of \$110,000.

U.S. Department of Interior Exterior Lumber Testing in Western National Parks

[<http://www.epa.gov/oppt/epp/update5.pdf>](http://www.epa.gov/oppt/epp/update5.pdf)

The National Park Service (NPS) Inter-Mountain Region, U.S. Army Corps of Engineers, and EPA's Region 8 EPP Program office are working together to increase NPS's use of products with environmentally preferable attributes. NPS and EPA will test and evaluate products using the principles and concepts contained in EPA's EPP guidance. The first pilot under the partnership will test the performance of recycled-content plastic lumber in varied climates in western national parks, including Dinosaur National Monument in Utah. For some uses, NPS considers recycled-content plastic lumber to be environmentally

preferable because it is made from post-consumer plastic and lasts longer than some alternative materials. For other uses, NPS prefers pressure-treated wood. To help NPS employees decide which type of lumber to purchase, the project team is developing a purchasing toolkit. To address concerns about the toxicity of pressure-treated wood (one common preservative in pressure-treated wood is arsenic-based), NPS is investigating the use of wood treated with oil- and water-borne preservatives.

U.S. Environmental Protection Agency

EPA's Region 10 Remodels With EPP

[<http://www.epa.gov/oppt/ppg/case/region10.htm>](http://www.epa.gov/oppt/ppg/case/region10.htm) and

[<http://www.epa.gov/r10earth/innovation.htm>](http://www.epa.gov/r10earth/innovation.htm)

In April 1999, EPA Region 10 put the finishing touches on the 2,085-square-foot executive office space for its offices in Seattle, Washington, which included remodeling the Regional Administrator's office. With its wide variety of green features—from sustainably harvested wood products to carpeting designed to be renewed (supercleaned, retextured, and recolored)—the project serves as an innovative model for others in both the public and private sector. The \$137,000 contract included \$81,000 of products with positive environmental attributes.

EPA Builds Lab With Green Rider

[<http://www.epa.gov/ppg/case/region7.htm>](http://www.epa.gov/ppg/case/region7.htm)

In March 2001, EPA's Region 7 plans to break ground on a 37,000-square foot laboratory in Kansas City, Kansas. The region issued a "Green Lease Rider" (or "Green Rider") in July 1999, specifying a comprehensive set of environmental design considerations for the new laboratory. When potential construction contractors submit bids to build the new laboratory, they are required to address the Green Rider as part of the proposal process. The contract is expected to be awarded in Summer 2000.

Leading by Example: How EPA Incorporated Environmental Features into New Buildings

[<http://www.epa.gov/oppt/epp/grnblgd.pdf>](http://www.epa.gov/oppt/epp/grnblgd.pdf)

EPA's new headquarters facility in Washington, DC, and its new 1 million-square-foot, \$250 million research facility in Research Triangle Park, North Carolina, both include features designed to protect

indoor air quality, maximize energy efficiency, reduce water consumption, encourage alternative forms of transportation, and promote pollution prevention throughout the construction process. Design teams for both facilities also examined the environmental impacts of selected materials and furnishings from a lifecycle perspective to select those with minimal adverse effects to human health and the environment.

United States Postal Service Fort Worth Post Office Showcases Green Building

<<http://www.epa.gov/ppg/case/usps2.htm>>
and
<<http://www.usps.gov/environ/welcome.htm>>

The 8th Avenue Station of the United States Postal Service (USPS) in Fort Worth, Texas, assembled a task force with the sole purpose of “greening” the organization’s current design criteria, which are the key elements of USPS’s Building Design Standards. The task force identified approximately 120 environmental attributes that were incorporated into the organization’s building design standards. The materials and systems used to construct the 8th Avenue USPS office building were selected to promote a healthy indoor environment and water and energy efficiency and to maintain the environmental integrity of the local ecosystem. USPS was able to incorporate a significant number of environmental attributes into the new

post office without compromising its budget. Opened in January 1999, the 26,000-square-foot, \$2.5 million post office serves as the showcase of the USPS Green Buildings Program and demonstrates

its commitment to EPP. Anticipated annual savings include \$1,100 in energy costs and 1 million gallons—or at current prices, \$2,800—of water.



Copiers, Paper, and Printing Projects

U.S. Department of Defense Fort Bragg Solves a Pressing Dilemma

<<http://www.epa.gov/oppt/epp/update5.pdf>>

A mix of creativity and technology helped the U.S. Army’s Fort Bragg purchase new digital printing equipment that is preventing pollution and saving money. As a result of this EPP-based decision, Fort Bragg, located in Fayetteville, North Carolina, has eliminated 1,500 gallons of hazardous waste from its printing operations and slashed its chemical purchasing and disposal costs by more than \$100,000 a year.

U.S. Environmental Protection Agency

EPA Sets the Standard for Copiers

<<http://www.epa.gov/oppt/epp/update6.pdf>>

As part of its 1999 photocopier pilot project, EPA’s EPP Program reviewed green copier purchasing standards adopted by several different countries. It also reviewed standards developed by EPA’s ENERGY STAR® Program and organizations such as Green Seal, an environmental standards organization. Based on its review, the EPP Program identified mandatory and preferred environmental attributes, such as energy efficiency and low emissions of dust and ozone, which were incorporated into two recent photocopier solicitations. The solicitations garnered a small response from photocopier vendors, which the EPP Program attributes to the small size of the purchase requests—one small copier for each solicitation. Bulk or cooperative purchases are expected to generate higher interest from vendors.

Paper Pilot Projects

<<http://www.epa.gov/oppt/epp/docupdates.htm>>

Beginning in March 1999, EPA’s EPP Program began printing its newsletter, the *EPP Update*, on different kinds of paper selected for their positive environmental

attributes. The *Update* has featured kenaf paper, which comes from the kenaf plant and requires less energy and fewer chemicals to convert to pulp than wood-based paper, as well as a 100-percent post-consumer paper that is not chemically de-inked and is process chlorine free. The *EPP Update* is published two to three times per year and has a circulation of about 3,000 readers. Whether printing is done in-house by the government or contracted to other printers offsite, the goal of the pilot is to encourage the use of more environmentally preferable papers. EPA's EPP Program also is involved in a paper pilot project involving the Government Printing Office and a number of other federal agencies. Initially, this project aims to identify, procure, and pilot test environmentally preferable copier paper. As this project evolves, environmental considerations could be applied to government purchase of envelopes, stationery, and other types of paper.

National Aeronautics and Space Administration

NASA's Environmental Copiers

<<http://www.epa.gov/ppg/case/larc.htm>>

The National Aeronautics and Space Administration (NASA) has approximately 2,000 copy machines throughout its 14 nationwide facilities. Thanks to the agency's innovative leasing practices, NASA saved \$4.5 million dollars during a 5-year photocopying service contract. NASA's "cost per copy" contract, which means the agency leases copy services rather than purchasing copiers, includes several environmental features important to NASA, such as recycled-content paper and energy efficiency requirements.

Electric Power

U.S. Department of Interior

Department of Interior—Making EPP Part of the Mission

<<http://www.epa.gov/oppt/epp/update5.pdf>>

The National Park Service has installed several photovoltaic (PV) systems throughout its parks, including the

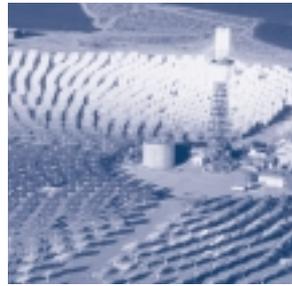
Grand Canyon, Joshua Tree, Isle Royale, and Glacier National Parks. PV systems contain solar cells that convert sunlight into electricity, which is less polluting than traditional energy sources. Producing 5 to 20 kilowatts, the PV systems are used to replace diesel-fueled generators or to supplement existing power supplies. Excess power generated by the PV systems can be sent back into the power grid.

U.S. Environmental Protection Agency

EPA Purchases Renewable Power

<<http://www.epa.gov/ppg/case/grnpwr.htm>>

Taking advantage of the nationwide deregulation of the electric industry, EPA is now purchasing 100 percent renewable energy in its Region 9 laboratory in Richmond, California, and its Golden, Colorado, laboratory. EPA's purchase of 100-percent "green" electricity for the Region 9 laboratory is a cooperative effort between Region 9, EPA's Office of Administration and Resource Management, EPA's Office of Air and Radiation, the Department of Energy's National Renewable Energy Laboratory, and the General Services Administration (GSA). The green electricity for the Region 9 laboratory is obtained from a nearby landfill gas plant. For Golden, Colorado, EPA has pledged to purchase 100 percent of its electricity from wind



energy. Since Colorado is still a fully regulated market, EPA is buying green power through a GSA area-wide con-

tract. EPA is currently pursuing additional 100 percent renewable energy power purchases in Washington, Massachusetts, and New Jersey.

Miscellaneous

U.S. Department of Defense Air Force Base, GSA Reduce Hazardous Purchases

<<http://www.epa.gov/ppg/case/mclelan.htm>>

McClellan Air Force Base, located in Sacramento, California, teamed with the U.S. General Services Administration (GSA) and its suppliers to develop new contracts for unit-of-use purchasing and just-in-time delivery. This was the base's response to a 1993 U.S. Air Force mandate that requires all facilities to reduce hazardous waste generation. By employing EPP principles, such as purchasing smaller quantities only when needed, McClellan reduced its inventory of hazardous products (e.g., paints, primers, epoxies, and sealants used to maintain and repair aircraft) from \$3.2 million to \$414,000 and significantly reduced hazardous waste generation and disposal costs.

U.S. Department of Energy DOE's Waste Isolation Pilot Plant

<<http://www.epa.gov/ppg/case/wipp2.htm>>

The Department of Energy's Waste Isolation Pilot Plant (WIPP), located 26 miles east of Carlsbad, New Mexico, is the world's first underground repository licensed to safely and permanently dispose of transuranic radioactive waste, a byproduct of nuclear weapon research and production. In 1993, staff at the plant developed a green procurement program for the purchase of items such as lamps, exit signs, motors, carpets, paints, and cleaners. Through this program, WIPP procurement officials are encouraged to buy "green." They receive training on purchasing products that minimize energy use, reduce toxicity, or are recyclable or contain recycled materials. The plant also has a pollution prevention committee composed of staff from several departments. The committee's primary goal is to promote awareness about waste minimization and opportunities for environmental purchasing. WIPP's energy manager collaborates with the committee, as well as engineers, chemical and lab managers, and construction managers, to research and identify new products for use at WIPP facilities.

U.S. Department of the Interior

A Shell of Its Former Self

<<http://www.epa.gov/oppt/epp/update5.pdf>>

On Earth Day 2000, the Department of Interior (DOI) concluded a 1-year pilot project that demonstrated the performance of biodegradable plates and bowls in its Washington, DC, headquarters cafeteria. Each month, the DOI cafeteria used 6,400 plates and 3,000 bowls made from limestone and renewable potato starch. The cafeteriaware, made by EarthShell® Corporation, is not only biodegradable in marine and compost environments, but also requires less energy to manufacture than comparable paper or polystyrene containers. Another component of the pilot involved collecting the compostable plates and bowls along with paper napkins, paper trays, and food waste for use in a composting research study conducted by a local U.S. Department of Agriculture (USDA) laboratory. USDA tested three different composting technologies. Each of them delivered a rich final product showing the great potential of a largely compostable cafeteria waste stream.

Although the pilot project has officially ended, the DOI cafeteria continues to use the EarthShell plates and bowls. The company is preparing to make the product commercially available and DOI continues to search for other environmentally preferable food service products.



U.S. Department of Transportation

Alternative Method for Aircraft Deicing

<http://www.dot.gov/affairs/1997/apa5197.htm>

The Federal Aviation Administration has approved the use of an innovative deicing system for business and general aviation aircraft, mitigating the potentially harmful environmental



effects of conventional chemical deicing. In the new deicing system, the plane travels through a special hangar where a

series of gas fired heaters emit infrared energy at wavelengths specially "tuned" to the absorption range of ice. The aircraft is deiced in minutes without the use of traditional deicing chemicals, which have been identified as potential water pollutants.

U.S. Environmental Protection Agency

Green Conferencing Tool

<http://www.epa.gov/oppt/epp/conference.htm>

EPA has compiled a comprehensive list of pollution prevention opportunities for greening conferences and meetings. EPA is also developing a multimedia, Web-based tool for conference planners and service providers. The "Planner's Track" of the interactive tool provides meeting and conference coordinators with a comprehensive overview of the different conference planning stages, products, and services, and the opportunities to "green" each. The "Service Provider's Track" educates hotels, printers, and caterers about the environmental opportunities in their service sectors. In addition, the site contains sample contract language for soliciting green conference and meeting support.

We want to hear from you!

Please tell us about your environmentally preferable purchasing activities and efforts. We are collecting and sharing information, tools, and hints about what works and what doesn't as environmentally preferable purchasing evolves and expands. Please contact the EPP program by e-mail, regular mail, or fax:

Environmentally Preferable Purchasing Program (7409)
U.S. Environmental Protection Agency
Ariel Rios Building
1200 Pennsylvania Avenue, NW.
Washington, DC 20460
E-mail: epp.pilot@epa.gov
Fax: 202 260-0178

Institutionalizing EPP

A few federal agencies are beginning to integrate EPP activities into everyday operations and procedures. This move beyond pilot projects to applying EPP institutionally not only makes it easier for agencies to significantly reduce the environmental impacts of their purchases, but also supports a growing competitive market for green products.

JWOD Organizations Are Greening Their Products

<<http://www.epa.gov/oppt/epp/update6.pdf>>

In the 1930s, the Wagner-O'Day Act became a law, requiring federal agencies to purchase products and services from non-profit agencies employing the blind. Senator Jacob Javits spearheaded the drive to amend the act in 1972 to include people with other severe disabilities. Today, the federal government's Javits-Wagner-O'Day (JWOD) Program is greening products sold through its program. Some of JWOD's nonprofit agencies already sell

products with positive environmental attributes, such as biobased cutlery manufactured with corn starch and clipboards made from recycled plastic.

Other nonprofit organizations associated with the program have been examining the environmental attributes of their products. To help these organizations, JWOD contracted with Green Seal, a nonprofit environmental standards organization, to conduct a pilot project. Products meeting Green Seal's standards earn the "Green Seal of Approval." So far, the seal has been affixed to calendars produced by the Easter Seals of Western Pennsylvania; business cards manufactured by Seattle Lighthouse for the Blind; and paper towels made by Signature Works, LC Industries, and New Orleans Lighthouse for the Blind.



U.S. Environmental Protection Agency

Green Tips for Government Credit Card Purchasing

<<http://www.epa.gov/oppt/epp/creditcard.htm>>

Credit card purchasing guidelines on the EPP Web site now make it easier for government credit card holders to ensure that their purchases comply with environmental laws and EPA policies. The guidelines identify specific attributes to look for when selecting products, including recycled content, reduced packaging, minimal hazardous materials or toxic chemicals, and the ENERGY STAR® label. In addition, the guidelines provide information on the procurement process, including specific EPA requirements, where to find the products (e.g., through GSA's Environmental Products Guide or office supply catalogs), and other sources of information and guidance.

U.S. Department of Interior

Greening the Department of Interior

The Department of Interior developed a strategic plan to encourage its employees to purchase products the agency deems environmentally preferable. A companion Web site, under development at the time of publication, will provide information on energy- and water-efficient products and environmentally preferable products. In addition, the site will include a searchable procurement tracking database, which will contain recycling coordinator contacts, the agency's waste prevention and recycling goals, and green products and practices already in use. In 2001, a link to this site will be available at <<http://www.doi.gov/oepec>>.



United States
Environmental Protection Agency
(7409)
Washington, DC 20460

Official Business
Penalty for Private Use
\$300