



PRINTING, WRITING & COPY PAPER

- In 2004, 102.7 million tons of paper and paperboard were consumed in the U.S. alone. While 49.5% of that was recovered, that left over 51 million tons of paper products to be incinerated or landfilled.
- 58% of used printing, writing and copy 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 many other benefits derived from the forest will be lost. For instance, forestlands conserve biodiversity by providing habitats where both plant and animal life can exist in healthy populations and humans can enjoy scenic views and recreation. In addition, trees produce oxygen and help to offset global warming by absorbing carbon dioxide.

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GREEN SEAL'S
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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 byproducts 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% postconsumer recycled content and the use of chlorine-free production methods. 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.

Federal Executive Order 13101 mandates that all federally-purchased printing and writing paper should contain no less than 30% post-consumer recycled fiber. These papers are produced by major manufacturers and are available across the country.

Papermaking and Its Impacts

Raw Materials

About 30% of the timber harvested in the U.S. is used to make paper products. 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. The Forest Stewardship Council (FSC) has begun to address certification of this commodity. However, few paper products in the United States are certified in this manner, and they are not yet widely available.

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*Original printed on Green Seal-certified
Mohawk Satin Cool White Recycled
paper, 30% postconsumer content*

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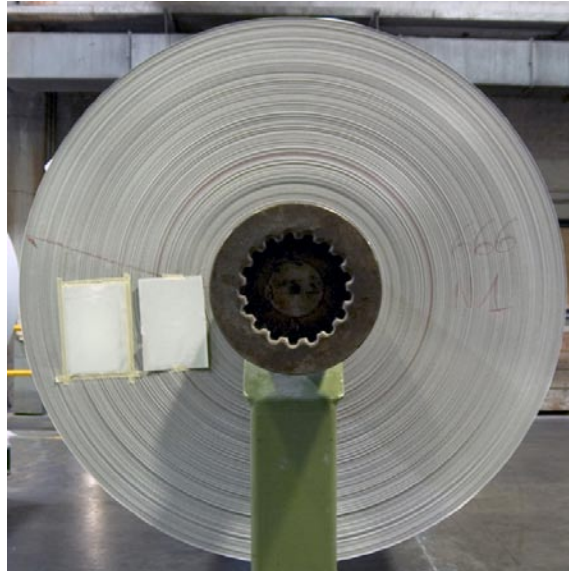


There are several alternative fibers on the market for producing paper, such as kenaf, hemp, agricultural residual materials, denim fabric and even paper money. The technologies are improving such that it is feasible to use papers made from these less conventional fibers. However, unless these fibers 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. This *Choose Green Report* focuses on post-consumer fiber and chlorine-free bleach in printing and writing paper.

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. Lignin is a glue-like material that holds the wood fibers together, and also makes wood-based paper rough to the touch. 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 involves 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

Paper is bleached to further dissolve the lignin, remove spots and impurities, and whiten the paper. Unfortunately, chlorination, the most common bleaching process, produces dangerous organochlorine compounds such as chlorinated dioxins and furans. Dioxin is a human carcinogen and is a suspected cause of reproductive, developmental and immune system disorders in humans. These compounds are known to persist in the environment, travel long distances to disperse all over the globe, and accumulate up through the food chain. It is estimated that the paper manufacturing industry releases 1.5 trillion gallons of wastewater each year that has been contaminated with organochlorine compounds. Strong consumer concern and

federal initiatives have forced many paper manufacturers to limit the amount of chlorine and chlorine derivatives used in paper production. Use of chlorine dioxide, a derivative of chlorine, can reduce these toxic releases by approximately 90% compared to the use of elemental chlorine. Much less damaging bleaching alternatives include hydrogen peroxide, ozone, and oxygen.

Papers are often identified according to bleaching classification:

- **Elemental Chlorine Free (ECF)** paper is processed without elemental chlorine, instead using chlorine derivatives such as chlorine dioxide. While this greatly reduces the amount of dioxin emitted into the environment, it does not completely eliminate it. And unfortunately, many other compounds that are harmful to aquatic life, humans, and animals are produced in the process.
- **Process Chlorine Free (PCF)** paper and **Totally Chlorine Free (TCF)** paper are manufactured without any chlorine compounds in their current production cycle. Alternative chemicals such as ozone, hydrogen peroxide, oxygen, or enzymes are used to whiten and delignify the pulp. PCF paper may still contain chlorine, however, from recycled fibers that may have been bleached with chlorine prior to being recycled. TCF paper contains only fibers that have never been chlorine bleached. Typically, this means that TCF paper contains only 100% virgin fiber, since most

recycled paper has been bleached with chlorine.

Green Seal™ recommends using PCF or TCF paper to encourage paper processing without use of any chlorine-containing compounds.

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 is a 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 has then been returned to a manufacturer via community and industrial recycling programs, thus being diverted from the stream of waste going to a landfill or an incinerator. The total recycled content refers to the total amount of post- and pre-consumer fibers contained in the paper.

The best rule of thumb is to look for a product with the largest postconsumer recycled content—higher postconsumer recycled content means fewer trees are needed to meet the demand for paper, thus lowering the burden on the environment. Recycling one ton of paper saves three cubic yards of increasingly scarce landfill space.

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, compared to that for its disposal. Although postconsumer recycled paper may have been chlorine bleached for its initial use, those past impacts cannot be undone. Virgin pulp, even when processed completely without chlorine or derivatives, still requires the harvesting of trees.

Making the Grade

Grades are used to distinguish among the different uses for a particular paper, which necessitate different performance characteristics. Common grades of printing and writing paper include bond/writing, text, and cover, as well as several others.

■ **Bond**—Bond paper is a strong, durable paper especially suitable for electronic printing and use in office machines, including copiers and desktop printers. It is characterized by erasability, good absorption and rigidity. *Bond* is sometimes used interchangeably with *writing* or *copy* paper.

■ **Writing**—Writing papers are commonly used for business letterhead, correspondence and forms. The paper surface readily accepts ink and can withstand erasures without damaging the surface.

■ **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 business cards, stiff brochures, report covers and other stiffer paper needs.

■ **Copy paper** (also called copier, printer, reprographic or xerographic paper) is typically a “white commodity paper” in the bond or writing paper category, with a typical basis weight of 20 pounds (see below). Many copy papers are now being marketed as “multi-purpose,” made to be used in the most common types of office machines, including copiers and different types of printers. Writing, text and cover papers are often offered together as a line of printing

Paper: Basic Sizes and Basis Weights

GRADE	Basic Size (in.)	COMMON BASIS WEIGHTS (lbs/ream)
Bond	17 x 22	13 - 24
Writing Papers	17 x 22	20 - 40
Text Papers	25 x 38	30 - 100
Cover Papers	20 x 26	50 - 130

and writing paper, all with matching design elements. They are often of heavier basis weight and utilize more coatings and inks than basic copy paper.

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, and can differ from the standard size of the final product. For example, a ream of 17" x 22" stationery (its basic size) that weighs 24 pounds is called "24 lb." This ream of 17" x 22" sheets of 24 lb. stationery produces four reams of 8.5" x 11" sheets, each weighing six pounds.

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

Reduce the weight of your copy paper to cut down on the amount of material used in its production. While the nature of the printing job at hand will generally dictate the grade of paper needed, there is often a range of basis weights within a given grade, offering flexibility in decision making. For example, by opting for 20 lb. writing paper instead of 24 lb. stock for business stationery, an office that uses only two reams per week would save 104 pounds of paper per year, reducing the impact on the environment by 16%. Selecting the lowest basis weight acceptable for your printing job will reduce the amount of pulp, resources used and waste generated for each sheet of paper.

Reduce Overall Paper Use

Reducing the amount of waste paper coming out of your office can indeed help our environment and it can also save your office significant amounts of money. Once you have determined the areas of paper waste that need to be attacked, brainstorm ways to limit paper usage in the office. Here are some suggestions to get you started.

- Reduce the number of pages you print by setting your copier default to duplex (copying on both sides of the paper).
- Reduce margin or font sizes used on your reports and therefore reduce the number of pages you print.
- Reduce the number of your repeat mailings by combining information into fewer major mailings.
- Reduce your 8½ x 11 image by 29% to fit two images on one page. Word processors can reduce page output by printing two or more text pages per sheet of paper.
- Reuse one-sided copies for printing draft copies of documents or as scrap paper. Use this paper as your copier's default supply.

Electronic Options

- Use electronic mail to distribute your memos and files around the office.
- Try using a fax modem so you can distribute documents by connecting to a fax directly without having to print out a copy of the document to send through your fax machine.
- Publish and order long documents on CD-ROM.
- Become an integrated paperless office. Offices which have a computer network can purchase systems which incorporate optical character recognition, form processing and archiving within the network using computers, scanners and various storage devices.
- Taking care in purchasing and making simple adjustments to your copier or printer could save money, landfill space, and environmental quality, all at the same time.



**Select Papers
with Post-Consumer
Recycled Fibers**

Buy the maximum postconsumer content paper available that meets your office needs. With recent advancements in technology, recycled-content paper can be found to meet virtually every printing and writing paper need, without sacrificing quality. Whenever possible, choose paper made with at least 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.

Paper manufacturing is the third largest user of fossil fuels worldwide. Recycling paper uses 60% less energy than manufacturing paper from virgin fiber.

**Use Discretion
with Brightness and
Bleaching**

Brightness is the percentage of light that reflects off the paper surface; the higher the number,

the brighter (whiter-looking) the paper. Certain documents will need to be white, but not always the brightest white available. Reducing brightness requirements will help encourage paper companies to reduce chlorine used for paper bleaching processes. Evaluate the need for whiteness against the potential environmental and health impacts of chlorine bleaching, and choose papers made without chlorine.

**Minimize the Use of
Coatings and Colors**

Coatings add 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 colored or coated papers.

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 42% 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.

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.

THE ADVANTAGES OF GREEN SEAL CERTIFICATION

Green Seal, Inc. is an independent, non-profit organization whose mission is to create a more environmentally sustainable economy by identifying and promoting environmentally preferable products and services. Green Seal has developed environmental leadership standards for dozens of product and service categories, including printing and writing paper, and its certification program verifies that products meet this stringent standard. Therefore, when purchasers see that a product is Green Seal-certified, they know that it is environmentally preferable because it has been validated by a reputable third party with no financial interest in the product or company that manufactures it.





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