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# PRINTtips

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## Printing, Paper, and the Environment

*“We are advantaged by the fact that our primary raw material is wood fiber, a renewable, recyclable natural resource. The sustainably managed forests and plantations from which we source wood fiber are essential to a healthy environment by sustaining vital plants and wildlife, filtering our water and air, and reducing greenhouse gases by removing carbon dioxide from the atmosphere.”*

– Sappi

Thoughtful use of the earth’s resources and protection of the environment may seem like an odd topic for a newsletter written by a printer. After all, printing requires paper, and the paper industry has been criticized for destruction of forests, water pollution, and other anti-environment actions. Printed advertising mail is portrayed as a nuisance to those who receive it and cited for adding to landfills. Even e-mail messages are critical of print – you may have seen this tag line as part of an e-mail signature: *Please consider the environment before printing this e-mail.*

Is printing really the environmental evil its critics assert? Should businesses and individuals adopt a policy of eliminating hard copies of documents and using only e-mail and digital media for sales and marketing outreach? Or are there other considerations that will allow businesses and organizations to continue to use printing and still be good environmental stewards?

### Paper

According to the Forest Stewardship Council, the United States is the largest market for paper products in the world. The US produces about 90 million tons of paper annually and consumes about 100 million tons. Approximately 35% of the 100 million tons consumed is satisfied by recycled fiber, and another 25% of recycled fiber is exported.

Of all the timber cut annually in the United States, about 25% is used for paper production as virgin fiber. The trees used for paper largely come from forests owned by paper manufacturers and are grown specifically for that purpose. That makes paper a renewable resource. In addition, paper manufacturers plant over four million new trees every year – more than are harvested.



In fact, the amount of forested land is increasing worldwide, particularly in more economically advanced nations. A report published in the *Proceedings of the National Academy of Sciences* assessed the status of forested land in 50 countries around the world. In 18 of the 50 nations, forest area increased and the condition of forests improved. The results of a study published in the *Quarterly Journal of Economics* demonstrated that demand for wood can actually lead to an increase in forested land so that the supply of trees can meet the demand.

Paper manufacturing requires both water and power. Today’s modern paper mills offer a closed system where water is recaptured and recycled, and power and electricity come from renewable biomass obtained from sustainably managed forests.

In their publication *Sustainable Procurement of Wood and Paper Products*, the World Business Council for Sustainable Development and the World Resources Institute offer this thought:

“Compared to other materials, wood and paper-based goods produced in a sustainable manner can be a wise choice because:

- **They come from a renewable resource** – trees, the product of sunlight, soil, nutrients, and water.

- **They capture carbon** – through photosynthesis, trees take carbon dioxide out of the atmosphere and replace it with oxygen, mitigating greenhouse gas emissions. In sustainably managed forests, the carbon released through harvesting is offset by that stored through regeneration and regrowth making these forests carbon-neutral.
- **They store carbon over the long term** – solid wood, panel, and other wood and paper-based products can effectively store carbon for decades or even centuries.
- **They are recyclable** – they can be reused, or converted into other products, extending their useful life and adding to the available resource pool of wood fiber.”

The same publication discusses recycling wood fiber and points out how well the paper industry uses all parts of a tree. Trees with low market value, small tree sections, and wood chips from saw mills are used for wood pulp, while bark and sawdust are used for energy.

### Digital Media and the Environment

Replacing print with digital initially seems like the best choice for the environment. However, there is growing recognition that going digital raises its own set of environmental concerns. One is the amount of toxic e-waste that results from upgrades to digital devices, including desktop computers.

Another concern is the amount of energy required to power digital devices and “cloud” computing. According to the U.S. Department of Energy, US data centers consumed about 70 billion kilowatt-hours of electricity in 2014, the most recent year examined, representing two percent of the country’s total energy consumption, according to the study. That’s equivalent to the amount consumed by about 6.4 million average American homes that year.

### Environmentally Responsible Printing

Though digital communication and technologies have become increasingly important to business operations, it is unlikely printing will be totally eliminated. Not every work station will be computerized, and not every customer or prospect will be a candidate for digital media. So there will always be a need for some types of functional forms and documents, as well as for image and marketing pieces.

Don’t overlook the importance of ordering the right quantity of printing, especially full color. We recommend a 3-6 month supply as an ideal amount. In the past you may have needed to order a larger amount of full color printing because of the fixed setup costs, but no longer. Our digital

equipment allows us to economically print small quantities – as low as 200 pieces in some cases – so you can keep your inventory small.

As you consider the design and printing of your forms and image pieces, keep in mind the things that will allow the piece to be easily recycled when it has served its purpose.

- **Think about total ink coverage on the sheet.** Printed sheets that are recovered for recycling often have the ink removed before being used again for new paper pulp. The more ink, the more de-inking that will be required when the original sheet is recovered and recycled.
- **Use aqueous-based rather than UV-cured post-press coatings.** If the printed piece requires a coating applied after printing to reduce scuffing, specify one that is aqueous-based rather than UV-cured. Aqueous coatings can be removed from recovered papers without emitting harmful byproducts. Recovered papers with UV coatings often cannot be de-inked which reduces their range of possible uses as recycled paper.
- **Discontinue thermography.** Thermography, sometimes called *raised lettering*, is a heat-sensitive process that was originally developed to mimic engraving. After printing, the wet ink is dusted with a thermoplastic resin powder that swells when exposed to high temperatures. These heat-set resins are not easily recycled and de-inking of thermography reportedly contributes to the formation of toxic sludge.
- **Eliminate foil stamping.** While foil stamping adds a dramatic and unique visual impact to printing, foil is difficult to remove in the recycling process.

### Keep on Printing

You don’t have to choose between printed products that your business or organization needs and protecting the environment. Paper is a renewable resource made from pulped wood grown in managed timberland and from waste paper. It is biodegradable and not dangerous– it will decompose harmlessly in a landfill. And paper is recyclable.

So reduce, reuse, recycle, and be responsible. But keep on printing.

# worlds

## a vocabulary of the graphic arts

**Acid-free paper:** paper that has had the acid removed during manufacturing so it has a neutral pH. Acid-free paper is often used for documents that need to be archived.

**Carbon sequestration:** the process by which carbon is removed from the atmosphere and stored in soil, biomass, geological formations, and the ocean.

**Deforestation:** the conversion of forests to other land uses including agriculture, cattle ranching, urbanization, and other uses. Also called *forest land-use change*.

**ECF/TCF papers:** papers made from pulp that has been bleached using hydrogen peroxide instead of chlorine. ECF = elemental chlorine free; TCF = totally chlorine free.

**Forest conversion:** the process of converting a natural forest to a cultivated forest. Typically accompanied by an increased focus on wood production.

**Greenwashing:** the practice of making unsubstantiated claims of environmental responsibility about a product, service, or company.

**Managed timberlands:** forests owned by timber companies that are managed by planting more trees than are harvested.

**Mill broke:** in a paper mill, the trim and other scrap paper resulting from the paper manufacturing process. Mill broke is recycled within the paper mill.

**Paper recycling:** the process of recovering waste paper and reusing it to make other paper products.

**Pre-consumer waste:** material that was discarded before it was ready for consumer use.

**Post-consumer waste:** material discarded after consumer use. Examples include magazines, newspapers, telephone directories, office and residential waste paper.

**Scrap paper:** paper suitable for recycling.

**Supply chain:** the steps through which paper-based products go beginning with tree harvesting and ending with final product distribution.

**Tree farm:** a type of managed forest where trees are planted and harvested repeatedly in a recurring cycle.

**Virgin fiber:** wood fiber that has never before been used to make paper or a wood product.

## T H E I D E A

### How Recycled Paper is Being Used

Recycling paper has become popular worldwide – over 95 million metric tons of paper are recovered each year and made into recycled paper and paperboard. Recovered paper fiber makes up over one-third of the total fiber used to make the world's paper.

The United States is the world's leading paper recycler, responsible for over one-third of all the paper recovered in the world. Here are some facts:

- More paper and paperboard packaging is recovered for recycling than all glass, plastic, metal, and other materials combined.
- 75% of all corrugated material and containers are recovered for recycling.
- 68% of all newsprint is recovered for recycling. About one-third is recycled back into newsprint. The rest is made into other products including cereal boxes, corrugated boxes, books, insulating materials, tissue, egg cartons, and animal bedding.

- About 66% of the raw material used to make paper in the U.S. comes from recovered paper that is recycled plus the wood debris left from lumber manufacturing.
- More paper is recovered than is sent to landfills.

Here's how post-consumer recovered paper is used: unprinted paper becomes toilet and tissue paper; printed white and colored writing paper becomes recycled copy paper; newspapers and magazines are used again for newspapers and magazines; and packaging material like corrugated boxes are used to make recycled packaging materials. Recovered paper can also be used in related products like egg cartons, wall insulation, roofing, and animal bedding.

*Statistics provided by TAPPI (Technical Association of the Pulp and Paper Industry)*

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## *Pressure Sensitive Adhesive Problems*

Although all paper can be recycled, some paper products may be rejected for recycling because of additives or processes on the paper.

One example is pressure sensitive adhesive; when added to paper to create peel-and-stick labels, the resulting product can't be recycled. This is because most paper recycling systems add water to recovered paper to create pulp - the first step in papermaking. Pressure sensitive labels don't dissolve in water. Instead, they break into smaller pieces that deform when subjected to heat and pressure. The deformed

particles are hard to filter out of paper pulp and can stick to papermaking equipment and even to the paper itself.

One of the major users of pressure-sensitive products is the United States Postal Service which accounts for about 14% of US consumption. (The products are pressure-sensitive labels and stamps.) Because of concern about recycling problems caused by pressure-sensitive adhesives, the USPS is leading a major effort to develop a recyclable version. Until the effort is complete, one alternative is to discontinue use of address labels and address directly on the mail piece.



*How is ink removed from recovered paper that is being recycled?*



There are two ways to remove ink from paper - by washing or flotation, or sometimes a combination.

In the washing process, soaps are added to paper as it is being pulped. The ink dissolves in the water which then can be cleaned and re-used. Ink removed by flotation requires air to be passed through the paper pulp. This produces foam that captures the ink. The foam is then skimmed off.

After de-inking, paper pulp may be bleached to increase brightness. Hydrogen peroxide is the most commonly used bleach since it decomposes into water and hydrogen.

Another method is to use inert, harmless brightening compounds.

Not all paper pulp needs to be bleached, and not all recovered paper needs to be de-inked. If ink is not removed from recycled paper during pulping, the ink will disperse in the pulp, discoloring it slightly. For some uses, this discoloration is immaterial.

Ink removed from recycled pulp can be burned to generate energy to run the paper mill, or can be used to make compost or gravel for roads.

*questions and answers*