

5

Things
Publishers
Need to Know
About PAPER

Presented by:



Paper Choice Matters.


Paper Choice Matters. As a major cost component of production, it has significant bottom line and brand implications. Because many publishers let their printers navigate their paper decisions, they limit their opinion and preference.

By partnering with your printer AND paper manufacturer, you will optimize your paper usage. The result, more options, more control and ultimately, more savings.

We believe there are FIVE Things Publishers Need to Know About Paper. Take a look!

LEARN MORE:

 [Impact of Fiber on Papermaking](#)
Pekka Komulainen, Industry Technical Expert

 [Paper Term Glossary](#)
Graphic Communications

 [Paper Manufacturing Process Overview](#)
Twin Rivers Paper Company

KEY TERMS:

Freesheet/Wood-Free

Because this fiber is chemically pulped it is very clean and free of lignin. The result is a strong, white, bright, long-lasting paper. Paper made from this fiber is typically used in high-quality applications and is associated with printability and performance.

Groundwood/Mechanical

Mechanically pulped, this fiber type uses the entire log, minus the bark. Because the lignin is retained in the refining process, groundwood papers will yellow or revert over time. Advantages of groundwood are bulk and opacity, however, they are often used for lower quality applications with a short shelf life such as newspapers, catalogs and magazines.

Hybrid/Blended

The blending of groundwood and freesheet fibers has created a new paper category that optimizes the strengths of each pulp type while retaining stability overtime. Hybrid papers deliver quality while enabling publishers to explore moving to a lighter weight. Hybrids are positioned as a value alternative to high-quality freesheet papers.

Fiber and Reversion

Over the years, the fear of paper yellowing over time (known as reversion) gives publishers caution about using groundwood containing paper.

The lignin in the high wood content oxidizes, altering the brightness and shade properties to create a “yellowing” effect. Freesheet papers are more stable because they don’t contain lignin. As a result, they set industry standards.

Recent manufacturing advancements challenge the status quo. State-of-the-art bleaching techniques combined with proprietary pulp formulations allowed paper manufacturers to innovate a category of paper: Hybrid. Formulated for stability, quality and value, these Hybrid papers increase the options for publishers.

Don’t be afraid to try different fiber formulations that support your branding and corporate identity standards. Freesheet is the default; however, we encourage you to experiment with Hybrid. You should see bottom-line savings with minimal impact on brand quality.

Paper 101:

Why paper turns yellow?

Paper is made from wood, which is made up mainly of white cellulose. Wood also has a lot of a dark substance in it called lignin, which ends up in the paper, too, along with the cellulose. **The exposure of lignin to air and sunlight is what turns paper yellow.**

WHAT IS LIGNIN?

Lignin makes wood stiff and trees stand upright. You could say it acts as a glue to bind the cellulose fibers together. It is a polymer, a substance that is formed by the joining of simpler molecules into giant molecules that act differently than the smaller molecules did. Dr. Hou-Min Chang, a professor of wood and paper science at N.C. State University in Raleigh, N.C., compares lignin to the concrete used in buildings, with cellulose as the steel frame.

Without lignin, Chang says, a tree could only grow to be about 6 feet tall. Lignin also helps protect the wood from pests and other damage. **Newsprint, which must be produced as economically as possible, has more lignin in it than finer papers.** At the mill, the wood that will be turned into newsprint is ground up, lignin and all.

LIGNIN AND PAPER TYPE

Paper manufacturers utilize the benefits of lignin in some types of paper, though. Brown kraft paper, the dark brown paper used in grocery store bags, and cardboard are stiff and sturdy because they have more lignin in them, and because those kinds of paper aren't treated with bleaching chemicals. It doesn't matter how dark they are because the printing on them is limited.

To make a fine white paper, the mill puts the wood through a chemical solvent process, which separates and extracts the lignin. Pure cellulose is white, and the paper made from it will be white and will resist yellowing.

OXIDATION

Lignin eventually turns paper yellow because of oxidation. That is, the lignin molecules, when exposed to oxygen in the air, begin to change and become less stable. The lignin will absorb more light, giving off a darker color. Chang says that if newsprint were kept completely out of sunlight and air, it would remain white. **After only a few hours of sunlight and oxygen, however, it will start to change color.**

Source: HowStuffWorks.com

LEARN MORE:



[Why Paper Yellows](#)

Scientific American



[Hybrid Papers Reversion Overview](#)

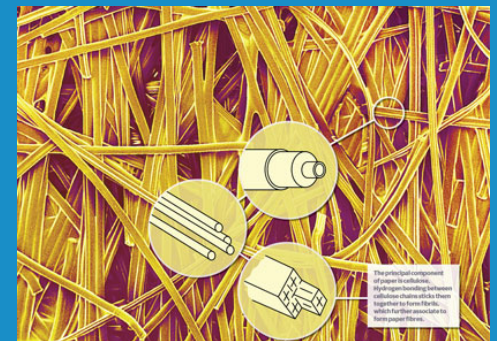
Twin Rivers Paper Company



[Hybrid Innovation](#)

Twin Rivers Paper Company

PAPER COMPONENTS



Cellulose fibers sticking together through hydrogen bonding to become the basis of paper.

Source: [Royal Society of Chemistry](#)

Note: Newsprint referenced in article is 100% groundwood, fine white paper is 100% freesheet

Thin To Win

Paper is sold by weight. For high volume publishing applications, Pages Per Inch (PPI) or caliper are a more meaningful measurement because they express thickness.

Paper manufacturers that run to PPI/caliper versus basis weight are more likely to deliver a consistent product that meets the desired specifications, translating to more controlled costs.

Experiment with “lightweighting.” Given manufacturing advancements, mills are making lighter papers that enable a publisher to retain bulk without sacrificing quality. A good place to start is a PPI comparison tool from the manufacturer, it is typically a part of standard paper specifications. Aside from the saving on paper costs, lightweight papers reduce shipping and postage costs.

When comparing publishing papers, focus on the PPI numbers. Try “lightweighting” by specifying a lower basis weight, you will be surprised and how easily you can reduce your total cost. You will get MORE books for the same amount of paper you bought in the past.

The Lightweight Advantage:

Bulk, Basis Weight and Pages Per Inch (PPI)

While many printers don't know the bulking characteristics of the papers they use, book manufacturers rely on accurate caliper (bulk) measurements for the papers used.

What determines the final thickness of your book? It's the caliper of the paper, known commonly as its bulk. Paper bulk is generally expressed as "pages per inch" or PPI. (Note pages...not sheets.) A 200 page book printed on 512 ppi stock will be .39" thick, generally rounded up to 13/32" or .40". The same book on a 360 ppi paper will be .55" thick, rounded to 9/16", .56".

As with most paper choices, there are trade-offs in selecting the appropriate bulk for your book. Ignoring the finish of the paper would pretty much mean a paper's bulk would be a direct relationship to its weight, i.e. a 38# paper would be thicker than a 34# paper. The bulk of a smooth paper is predictable, however, a coarser finish (like antique) could have a lighter basis weight and be thicker.

Lightweight papers (generally 45# and lighter) have the same relationship to finish as other papers. But some presses run faster with lighter papers, the lighter the better. Other presses have feeding and delivering problems that make running the paper all but impossible. The finish and formation of the paper can impact a presses ability to run lightweight stocks.

Basing paper selection on bulk alone can result in a book of the appropriate thickness but create opacity, weight, and cost issues.

If bulk is truly an issue, do your homework, and ask your printer the right questions.

Source: [Grub Street Printing Blog](#)

LEARN MORE:



[Yield Calculator](#)

Graphic Communications



[Caliper to PPI Converter](#)

McGrann Paper



[Job Estimator Tool](#)

Horizon Paper



[Roll Weight Calculator](#)

Bulkey Dunton



[Equivalent Basis Weight Chart](#)

Case Paper



[Printed Pages per Pound Calculator](#)

Horizon Paper

ESTIMATED BASIS WEIGHT IMPACT ON PAPER YIELD

Take a look at the chart from a paper distributor, Graphic Communications. You can get a sense for the potential savings of changing basis weight.

Proposed Basis Weight	Current Basis Weight							
	26	28	30	32	34	36	38	40
26	0%	7%	13%	19%	24%	28%	32%	35%
28	-8%	0%	7%	13%	18%	22%	26%	30%
30	-15%	-7%	0%	6%	12%	17%	21%	25%
32	-23%	-14%	-7%	0%	6%	11%	16%	20%
34	-31%	-21%	-13%	-6%	0%	6%	11%	15%
36	-38%	-29%	-20%	-13%	-6%	0%	5%	10%
38	-46%	-36%	-27%	-19%	-12%	-6%	0%	5%
40	-54%	-43%	-33%	-25%	-18%	-11%	-5%	0%

Don't Over Specify

Paper manufacturers offer a spectrum of products that range in quality. Variables like shade, brightness and opacity enhance quality while increasing the price.

The more additives used in manufacturing the more expensive paper becomes. To optimize your paper selection, work collaboratively with your paper manufacturer. Change a variable or two and gauge the results. A tweak in brightness or whiteness may not be discernable to the eye but will impact budget.

Don't pay for a functional or aesthetic attribute you don't need. Partnering with your paper manufacturer will help ensure you haven't "over specified" or overpaid for your paper choice. Not managing this choice or just using the same specs as last time could be impacting your profit margin.

Optical Properties:

Understanding the terms

Papermaking is filled with terms and tradeoffs. It is important to understand the optical properties you value and any potential tradeoffs. In North America, we tend to focus on brightness while in other parts of the world, whiteness is more commonly referenced. And one may assume the whiter the paper, the brighter, but that is not always true. Let's review the basic optical properties of paper:

Opacity measures the percentage of light passage through a sheet of paper. The more opaque, the less show-through. Basis weight, brightness, shade, fiber type, fillers and formation can influence opacity. Generally, opacity and brightness are inversely related, often causing the brighter paper to be less opaque.

Brightness is the amount of light reflected from the surface of paper, measured TAPPI or ISO standards. It is based on the length of narrow spectral range of blue light and isn't necessarily related to color or whiteness. If a paper has a brightness over 100, it means more light is reflected than was originally shown on the paper due to the addition of Optical Brightening Agents (OBA's). Given the impact of shade, two papers with the same brightness can look very different.

Whiteness is a measurement of light reflectance across ALL wavelengths of light comprising the visible spectrum. A true white paper reflects all the colors of the spectrum equally. A blue white shade absorbs some of the longer red and green wavelength while reflecting more of the shorter blue wavelength. A cream white shade absorbs more blue light. As whiteness is measured across the entire visible spectrum, it correlates more closely to the visual perception of a paper's appearance.

Shade is color of paper. It is defined using a universally accepted color measurement model like the CIE LAB model (CIE L*, a*, b*). It covers the full color space, whereas other models such as RGB or CMYK cover a subset of the LAB space. Blue White, Neutral White or Cream White are examples of shades. Note that lighting affects how a person sees a paper's optical properties – indoor lighting, outdoor lighting, or fluorescence can change the perceived brightness.

Look at your paper specifications to make sure you are not overspecifying the paper. Try backing off on one variable by a point or two. If you don't see a difference, neither will your customers. And, you will gain bottom line savings.

LEARN MORE:



Technical Overview of Optical Properties

Pekka Komulainen, Industry Technical Expert



Relationship of Brightness and Whiteness

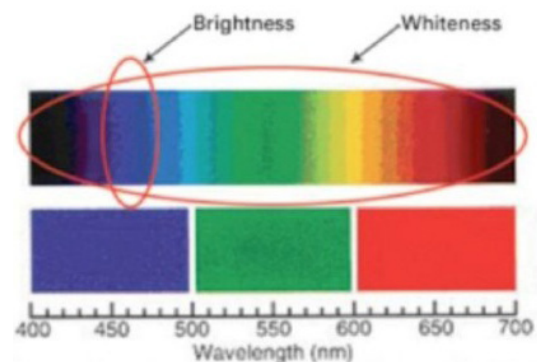
Technidyne



Tradeoff with Brighter, Whiter Papers

RISI Industry Intelligence

BRIGHTNESS VS. WHITENESS



Whiteness measures the full spectrum of visible light while brightness measures a narrow range of blue wavelengths.

Picking a Paper: The Decision Tree

Typically when evaluating paper, the buyer looks at the standard offering made by the paper manufacturer. It's a family of papers available in a range of basis weights and with options in the areas of shade, finish, fiber certification and recycled content.

Just like anything that gets made, from chocolate to cars, what goes into the finished product impacts the cost. The more you add, the more expensive the finished product.

Paper is no different. We call it over-specification. If you are using a higher opacity or heavier basis weight than required, you are probably paying more than you need for your paper.

Think about your paper usage, and ask yourself these questions:

Are you using the right fiber type?

The highest quality publishing paper is a bright, opaque freesheet, ideal for applications requiring permanence and aesthetics. Moving to a groundwood paper will easily lower costs with some significant trade-offs in the areas of reversion and brightness. A new option is Premium Hybrid paper. It blends groundwood and freesheet fiber, optimizing the attributes of each, bridging the quality gap.

Have you tested different brightness or opacity levels?

Paper manufacturers offer a range of optical properties. Most buyers think they need the highest brightness or the most opacity, but they don't. Depending on the application, changing either variable by a point or two may not be noticeable to the eye but WILL impact the bottom line.

Are you using the ideal basis weight?

Moving to a lighter paper is an easy way to drive cost-savings. It might have a higher price, but you will use less as you pay for paper by weight. PPI, (Pages per Inch), is a key variable to determine paper thinness. Mills that focus on finish have more of a range of PPI numbers. Those that run to caliper offer more PPI consistency. The thinner the paper, the higher the yield—which translates to saving money.

Should you explore a customized paper?

If you are not certain the mill has exactly what you need, the next option to co-develop a customized paper. This process enables you to pinpoint EXACTLY what you need. The specifications are agreed upon by the mill after rigorous product evaluation and testing. It is important to note that volume can be a barrier to entry for this option. Manufacturers require fairly significant quantities to customize a product.

Remember to periodically re-evaluate your paper to ensure you aren't over specifying. Paper manufacturers will work with you to test variables and make recommendations.



Think Global Sustainability

Publishers are printing around the world. Often publishing papers are specified locally using very generic category names. Do you really know what you are buying? Is it made in a sustainable operation? Is the fiber sourced responsibly?

The rigor associated with international fiber certification standards such as the Sustainable Forestry Initiative® or Forest Stewardship Council® drives global consistency. Make sure you are using a paper made by a reputable and certified supplier.

And don't forget you can find suppliers that developed the supply chain to deliver paper around the globe. By standardizing the specification, you will reduce potential problems while increasing the consistency of your finished publication.

Printing internationally is a reality. Work with like-minded paper manufacturers that subscribe to the rigors of fiber certification standards, ensuring transparency and promoting sustainable manufacturing practices.

Sustainability Simplified:

Industry best practices

Fiber certification has become the default for sustainable sourcing. Of course, we all know there is more to the environmental story. This list from Sustainable Forest Products (a joint effort from the [World Resources Institute](#) and the [World Business Council for Sustainable Development](#)) provides 10 key issues formulated as questions to help you evaluate your suppliers in a global context:

Sourcing and legality aspects	 Origin Where do the products come from?
	 Information accuracy Is information about the products credible?
	 Legality Have the products been legally produced?
Environmental aspects	 Sustainability Have forests been sustainably managed?
	 Unique forest values Have unique forest values been protected?
	 Climate change Have climate issues been addressed?
	 Environmental protection Have appropriate environmental controls been applied?
	 Fresh and recycled fiber Have fresh and recycled fibers been used appropriately?
Social aspects	 Local communities, indigenous peoples, and workers Have the needs of local communities, indigenous peoples, and workers been addressed?

Source: SustainableForestProducts.org

Procurement Policies

Global publishers take paper procurement very seriously, understanding the larger social, environmental and financial implications. A clear, up-to-date paper procurement policy is essential in achieving true sustainability.


HarperCollins crafted a comprehensive procurement policy, incorporating forest management, chlorine, chain of custody certification and reduction in the areas of basis weight, waste and print on demand technology.

“In order to produce materials responsibly we have adopted high standards for the procurement of paper. We actively work with our suppliers to maximize the efficient use of paper and reduce consumption.” [Read more](#)

Want to see another paper-based procurement policy? [Take a look at Staples' statement.](#)

LEARN MORE:

 [A Deeper Dive into Sustainable Procurement \(WRI\)](#)
World Resources Institute

 [Guidelines for Sustainable Paper Products](#)
GreenBlue

 [Why Sustainable Forests Matter](#)
Sustainable Forestry Initiative (SFI)

 [10 Rules for Responsible Forest Management](#)
Forest Stewardship Council (FSC)

 [Basics of Sustainable Forestry](#)
The Conservation Fund

 [Print and Paper Myths and Facts](#)
TwoSides North America

Free Resources

Paper manufacturers offer valuable resources that can help a publisher select or co-develop the right paper.

Don't be afraid to leverage the expertise of the sales, technical support, R&D and product development teams. They are experienced and focused on helping customers. Working with smaller specialty mills delivers inherent flexibility and more of a willingness to customize solutions.

Many companies will provide a trial roll, allowing a publisher to "tail into" an existing print run and compare various substrates. It is a great first step in evaluating a paper, especially if you want to try "lightweighting" or tweaking paper properties like brightness or whiteness.

Additionally, most mills offer field support in which a technical team will answer questions AND even be onsite when trialing paper. These resources proactively partner with printers to serve as a value-added resource.

Use the resources available through your paper manufacture to help with the paper specification process. They can deliver trial rolls and after-sale support to minimize any risks associated with testing new papers.

Leverage Relationships:

Reasons to work with a paper mill

Printers and paper distributors typically manage relationships with paper manufacturers. If you are exploring paper options, build a relationship with the paper mill. Their manufacturing expertise and access to additional resources will enhance the process and potential recommendations.

Here are six reasons you should involve the paper manufacturer:

- 1. Publication Analysis:** A mill will ask for a sample of your publication for a quick analysis, to measure the specifications and evaluate print requirements. They will often ask questions about objectives, budget, deadlines, supply chain, etc. to ensure they have context before recommending papers.
- 2. Paper Knowledge:** Although technology continues to advance, most mills have been making paper for centuries. They intrinsically understand the correlation of paper attributes to performance and budget and can quickly offer insight about paper characteristics, basis weight and fiber options.
- 3. Research and Development Resources:** Mills typically have Research and Development resources with access to state-of-the-art testing equipment, pilot paper machines and in-house printing capability used to partner with customers to co-develop custom papers (volume minimums apply).
- 4. Sample Service:** Mills are able to provide customers with cut plain paper, swatchbooks that highlight the offering and commercially printed samples. These tools give a publisher the ability to quickly compare a variety of papers.
- 5. Trial Roll Programs:** Whether you want to explore a tweak in specifications or change basis weight or customization of a paper, the mill can provide rolls to the printing facility for the specific purpose of trialing. This gives the publisher the ability to evaluate the performance of the paper on press.
- 6. In-Field Resources:** Aside from the traditional customer service and outside sales teams, most mills employ a technical team of printing and paper experts that spend their time in customer operations monitoring any trials and ensuring the paper is running trouble free. They typically have a technical background with knowledge of printing, web handling, label production, press chemistry, converting processes and finishing.

Want to reach out to a mill? Your printer and merchants have the contacts or give the mill customer service department a call to direct you to the right person within the company.

LEARN MORE:

▶ [Expertise of Technical Field Service Team](#)
Twin Rivers Paper Company

☰ [Publication Analysis Submission](#)
Twin Rivers Paper Company

TECHNICAL EXPERTISE



One of the benefits of working with the mill is their access to technical resources including lab testing equipment.

Summary

With international capability, maintaining quality specifications, expanding reach or controlling a budget, publishers are being asked to deliver more for less. Although there are many variables in the equation, paper does matter.

Remember the 5 Things Publishers Should Know About Paper:

1. Fiber and Reversion

Explore Hybrid papers that are engineered to minimize reversion while bridging the quality gap with Freesheet.

2. Thin to Win

Using a lighter weight paper will drive cost savings.

3. Don't Over Specify

Periodically review your paper properties to ensure you are not paying attributes you don't need.

4. Global Sustainability

Work with reputable manufacturers to procure fiber from sustainable sources.

5. Free Resources

Build relationships with paper mills to leverage their expertise and resources.

Work closely with your paper manufacturer in conjunction with your printer. **You can impact the bottom line and overall quality of the publication.**

LEARN MORE:



[Publishing Paper Overview](#)

Twin Rivers Paper Company



[Publishing Paper Portfolio](#)

Twin Rivers Paper Company



[Company Fact Sheet](#)

Twin Rivers Paper Company

About Us

Twin Rivers understands a publisher's needs. With a legacy of making paper for the past 80 years, we work side-by-side with publishers and printers around the world to engineer a targeted portfolio of papers.

Our team of publishing experts is ready to evaluate your materials and make recommendations. Our portfolio is robust, whether you are looking for a freesheet, premium hybrid or customized paper. We have the right product for you.

**Call 1-800-920-9988 or visit
TwinRiversPaper.com**



WE HAVE BUILT A REPUTATION OVER THE YEARS FOR...

Product Innovation

Our freesheet papers set industry standards while our new innovative category of hybrid papers deliver publishers another option that drives bottom line savings without sacrificing quality.

Unique Approach

We ask a lot of questions before we talk about product to ensure we understand your project objectives. The more we understand about your requirements, the more value we can deliver.

Customization

Our manufacturing flexibility enables Twin Rivers to deliver custom paper solutions in the areas of fiber blend, PPI, basis weight, shade opacity and brightness. The result is a tailor-made paper.

Global Capability

Our International service platform ensures we can supply paper around the world, including South America, Europe, China and Canada. By consolidating your specification you increase consistency regardless of the print source.