SELECTING
WIDE-FORMAT PAPERS
FOR TECHNICAL DRAWINGS, MAPS, AND PRESENTATIONS

Choosing the Right Materials for Wide Format Inkjet Printers and Xerographic Copiers

Freedom Paper

Introduction

This guide can help you select the right paper or film for printing large-format technical documents, maps, presentations, and simple indoor signs on an office wide-format inkjet printer, engineering copier or multi-function printer/scanner/copier (MFP).

Here's why it's important to know how to order the right paper:

Not all wide-format printers and copiers can handle every type of wide-format paper that is available online.

This does not mean you must stick with paper supplied by your printer manufacturers. But you should know a few printer specs before you place an order.

It's aggravating to receive rolls of wide-format paper that don't work with the wide-format printer in your office or studio. For example, if it's been a few years since your company bought a new printer, it can be painful to discover that your wide format printer can't handle inkjet media thicker than 9 mils. Or, the diameter of a 500-foot-long roll of wide-format paper may be too large to load on your printers.

At Freedom Paper, we understand why companies may want to keep older printers operating. So, we offer many papers and films that work effectively on these popular older models. We also offer eco-friendly materials from recycled materials and responsibly managed forests. These products don't require compromising on how a print reads and feels.

Many companies now operate older aqueous-ink printers alongside newer models, including some that use new eco-solvent, latex or UV-cure inks. We offer papers and other materials that work on these printers, too.

Use the tips, charts, and definitions on the following pages to zero in on the right products for your specific projects and printers.

Know what will be printed and why

Now that designs and correspondence originate as digital files, some people question the need to print hard copies of documents related to architecture, building, engineering and mapping projects. But as shown below, there are at least five good reasons why printing still matters.
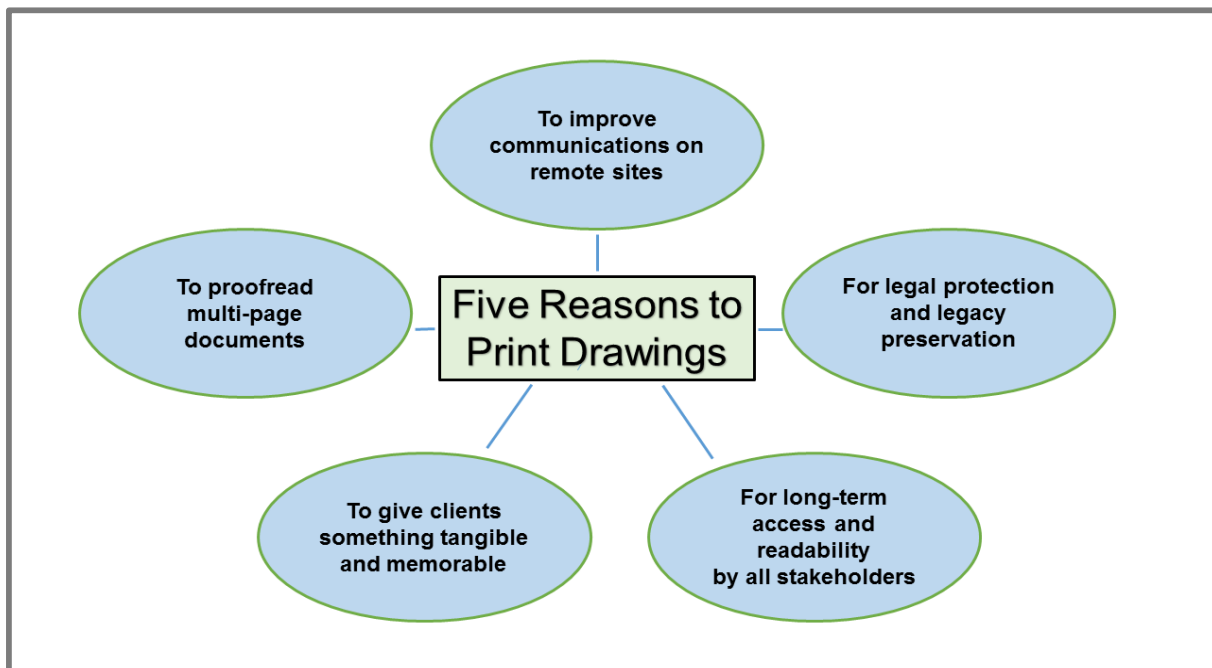
Knowing what type of documents will be printed and why matters.

The budget-friendly bond paper that's perfect for everyday drafts or quick proofs may be unsuitable for client presentations, archival records, proposals, orthophotography, infographics, full-color maps, posters, or simple signs.

You may need a paper that can handle the higher ink densities associated with color images and maps.

Know whether the 'wide format plotter paper' will be printed with inks or toners.

"Wide-format plotter paper" is a commonly used (but outdated) term for the uncoated or coated bond papers used to reproduce technical drawings and architectural renderings.

The term "plotter" is a holdover from the first wide-format devices that used computer-driven pens to create graphical representations ("plots") from the relatively small files created by the earliest versions of computer-aided design (CAD) software in the 1970s and '80s.

Today, some "wide format plotter paper" is designed to produce optimal results with the tiny droplets of liquid inks produced by wide-format inkjet printers. Other wide format plotter paper is designed to ensure optimal adhesion of the dry toners used in wide format xerographic copiers.

Here's a quick overview of the differences between inkjet printers and xerographic copiers and why they require different types of paper:

## Wide-Format Inkjet Printers for Technical Drawings and Office Graphics

These wide-format devices eject tiny droplets of water-based (aqueous) inks onto the surface of uncoated or coated papers, coated films and vellums or coated Mylar.

A higher level of print quality can be obtained on papers that have an ink-receptive coating that ensures the tiny droplets of ink don't bleed into one another or into the paper.

Brands of wide-format inkjet printers for architecture, engineering, construction and office documents include:

- HP Designjet T series
- Canon imagePROGRAF color printers
- Epson SureColor T series

The HP Designjet and Canon imagePROGRAF printers use dye inks for color along with pigment black inks. The Epson SureColor T Series uses UltraChrome XD pigment inks.
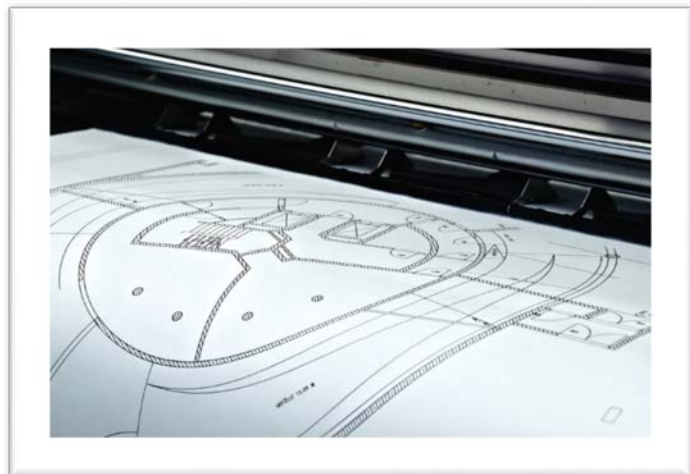
Emerging Technology Alert!

New Production-Speed Inkjet Printers Use Fixed-Array Printheads

Unlike inkjet printers that use moving printheads, a new generation of high-speed production inkjet printers is emerging. These printers use a fixed-array of printheads that spans the full width of the printer. The paper advances beneath a "waterfall" of fast-drying aqueous ink droplets at speeds of 6 to 12 inches *per second*.

Printers in this category include the Océ ColorWave 900 from Canon Solutions America, the Xerox IJP 2000, the RTI Digital Vortex 4200, and HP's PageWide XL series. These printers work best in climate-controlled environments with a limited range of pre-qualified papers.

Wide-Format Xerographic (Laser/LCD) Printers

These wide-format devices are sometimes referred to as engineering copiers. Instead of inks and printheads, they use an electrophotography process and dry toners. Basically, the toner is transferred from a drum onto an electrically charged surface that controls where the toner will be deposited to form the document file. The toner is then fused to the paper with heat.

Popular models of wide-format xerographic printers for technical drawings include: KIP, Xerox, Ricoh Aficio, Océ PlotWave, and Océ ColorWave.

Multi-Function Printers (MFPs)

These wide-format devices include an onboard scanner and enable you to scan, print, copy, and send documents from a single device. Built-in scanning makes it possible to capture and share handwritten, on-site changes, and color mark-ups and integrate them with satellite imagery, photographs, maps, and other documents. Some MFPs are inkjet printers. Other MFPs are xerographic devices that use toners.

Know whether you want rolls of paper or cut sheets.

Most users of wide-format printers buy rolls of wide-format paper. Roll paper enables uninterrupted printing of high volumes of prints with minimal user intervention. On some printer models, you can load more than one type of paper roll and automatically switch back and forth as needed.

If you don't mind doing some trimming and print-flattening afterward, you can also print multiple smaller documents across the width of the roll. Software programs can help you "nest" the pages for minimal paper waste.
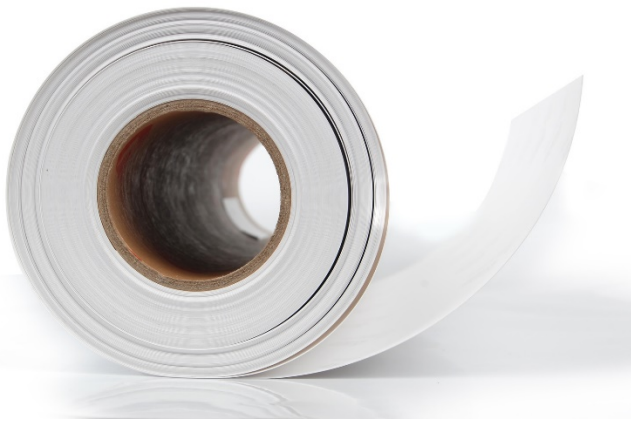
Some papers are available as cut sheets. Sheets of paper are ideal for drafting. Sheets can also be useful if you only want to print one or two copies of a scanned drawing, map, or rendering on a wide-format printer. The prints remain flat and won't have to be trimmed because you can choose the sheet size you need for the final print.

Do I have to use the same brand of paper as the printer?

No. Because most companies use more than one brand of printers, most inkjet and xerographic papers have been developed and tested to work on multiple printers.

Stocking one brand of paper for all makes and models of inkjet or xerographic printers is more economical and requires less storage space.

The major advantage of using paper from your printer manufacturer is that their papers will already be listed in the print driver software settings.

When you buy materials from brands such as Freedom Paper, Sihl, and Magic, you will receive instructions on which print settings will provide the best results for your printer model.

Understand paper and films for inkjet printers.

Uncoated Bond	Budget-friendly, 20 lb. or 24 lb. white paper similar to paper for desktop printers or office copiers. Fine for drafts, monochrome prints, and text documents.
Coated Bond	Bond paper with a surface treatment that keeps ink droplets from spreading through the paper fibers. Good for sharp, accurate printing of fine lines, small text, and multi-color drawings.
Premium Coated Bond	High-quality 24 to 32 lb. bond papers for drawings and documents with small photographs or colorful charts. Some premium coated bonds have anti-curl back coatings to help the cut prints stay flat.
Heavyweight Presentation Paper	These 35 to 55 lb. premium coated papers are more opaque than lighter weight papers can handle the heavier ink coverage in documents with multiple photos or color blocks. The ink-receiving coating supports bright, clean contrasts, rich colors, and smoother gradations between tones.
Eco-Friendly Bond	This paper contains at least 30% post-consumer recycled paper. "Post-consumer" paper has been used, discarded, and recovered from the waste stream. The pulp to make the paper comes from sustainably managed forests.
Photo Paper	The ink-receiving coatings on inkjet photo papers prevent inks from soaking into the paper. If the droplets of ink spread in unpredictable ways, image details get blurry and colors aren't predictable or repeatable. Back coatings help the paper support heavier ink loads when four or more colors are mixed to create photographic images.
Translucent Bond	Smooth 18 lb. white bond paper. Economical option for non-archival printing of translucent overlays and blueprints.
Vellum	Translucent, 100% cotton fiber, solventless, inkjet paper for archival overlays and blueprints. Heavier weight vellum (20 lb.) offers more durability.
Mylar Film	A thin, plasticized film that provides an archival alternative to traditional drawing paper. Prints are dimensionally stable and unaffected by humidity and temperature extremes. The double-matte version has an ink-receiving coating on one side and a marker-compatible surface on the other side.
Clear Films	Clear, semi-rigid plastic films for overlays or simple signs. Older-model HP Designjets require films with removable edge strips.

Understand paper and films for xerographic copiers.

Unlike coatings formulated to control the spread of ink, the coatings on wide-format papers for engineering copiers are formulated to enhance the adhesion of the toner to the paper.

Rolls of xerographic wide format papers typically have a 3-inch core. Some Xerox wide-format copiers require that the rolls of paper be taped to the core. Most of Freedom Paper's bond papers for engineering copiers are available in taped-roll or untaped forms.

Opaque Bond	This paper feels like the fibrous, durable, slightly textured paper used to print money, government bonds, and high-quality stationery. Opaque bond produces excellent resolution and can be purchased with blue, pink, green, or yellow tints.
Bond Laser Paper	This paper is available 20 lb. standard or 24 lb. premium rolls.
Eco-friendly Bond	Bond paper manufactured with at least 30% post-consumer-waste recycled paper. The pulp to make the paper comes from sustainably managed forests.
Translucent Bond for Laser Printers	Budget-friendly, non-archival translucent alternative to premium vellum or Mylar film.
Solventless and Production-Quality Vellum Paper Rolls	100% cotton fiber, solventless paper for archival overlays and blueprints. Produces crisp lines and high-resolution images.
Mylar Film	Plasticized markable film provides an archival alternative to traditional drawing paper. Use it for drawings that will be marked up in meetings or exposed to weather on a construction site. Mylar is unaffected by humidity and temperature extremes, including the heat of engineering copiers. This dimensional stability minimizes shrinkage and image distortion and enhances print longevity.

Know a few key specs before ordering.

In addition to knowing whether your output devices uses ink or toner, you need to know the roll widths, sheet sizes and thickness of wide-format paper that your inkjet or xerographic wide-format printer can handle.

Thickness	The thickness (caliper) of the paper is typically expressed in "mils," which is one-thousandth of an inch. Check the manual or spec sheet for your printer to understand the types of inkjet papers or other materials that your printer model was engineered to handle. When an inkjet material is too thick for your printer, the printhead might strike the surface of your paper, damaging both your print and the printhead. Paper that is too thick or thin for your printing device might not always feed correctly, causing skewed lines and other visible errors. **Many wide format inkjet printers that are designed to print on bond papers can only feed inkjet materials that are less than 9 mil thick**. This means they can't handle the professional photo papers, art papers, canvases and sign materials that range from 10 to 24 mils thick. Some 5-mil self-adhesive materials may actually be 11 or 12 mils thick when you consider the thickness of the release liner that protects the adhesive during printing.
Roll Width	The roll width is expressed in inches and is typically the first number in the paper specification (e.g. a 24 in. x 100 ft. roll)
Roll Length	The length of an inkjet paper roll is expressed in feet. Bond papers are commonly sold in lengths of 500 feet, so that you don't have to reload the paper when printing multiple sets of drawings. Heavier or thicker papers or films for special applications are typically sold in roll lengths of 100 to 150 feet.
Core Diameter	The core size is the diameter of the cardboard tube on which the paper is rolled. Plotter paper rolls for inkjet printers are typically sold on 2-inch cores. Paper rolls for xerographic copiers are typically sold on 3-inch cores. If you printer has a 2-inch spindle, you need a core adapter to load inkjet media rolled on a 3-inch core. Newer HP, Canon, and Epson printers come with core adapters. But even with core adapters, older CAD/technical printers may not be able to use long rolls of media sold on 3-inch cores because the total diameter of a 500-ft. roll of paper on a 3-inch core may be too large to fit on a printer designed with 2-inch spindles to handle 150-foot rolls.

Understand other specs associated with papers.

Paper Weight	The weight of bond paper is typically expressed in pounds (lbs. or #). A 24 lb. paper means that 500 sheets of a standard size weighs 24 pounds. In comparison, 500 sheets of the same size of paper would weigh 20 pounds. In many countries, the International Standards Organization (ISO) defines paper sizes. In these countries, the weight of paper is expressed in grams per square meter (gsm) instead of pounds. For example, a single sheet of A0 paper (which equals one square meter) could weigh 80 grams, 100 grams or 120 grams. Newsprint ranges between 45 and 50 grams per square meter and high-end art papers range from 200 to 500 grams per square meter. The heavier weight art papers and canvases range from 17 to 23 mils thick, compared to bond papers and films that are 6 to 9 mils thick.
Opacity	White paper is designed to uniformly illuminate the layers of colorants printed on the paper's surface. As the white light strikes the paper, the various colors that make up the white light are either reflected from the surface, absorbed by the paper, or transmitted through the paper. Opacity is a measure of how much light is blocked from being transmitted through the sheet. Papers with lower opacity levels (e.g. 85%) won't look as bright as more opaque papers and anything printed on the back side may be visible in the unprinted areas of the front side. Papers with an opacity levels of 95% or above are best for presentations, particularly those that will be mounted or displayed.
Brightness	This is a measurement of the light reflectance of the surface of the paper using a calibrated wavelength of blue light. It is measured on a scale of zero to 100. A paper with a brightness rating of 98 reflects more light than a brightness rating of 95 or 84. A paper with a brightness level above 100 includes optical brightening agents that absorb ultraviolet (UV) light (that is invisible to us) and re-emit that energy as visible blue light. Papers with a lower brightness level absorb more light. This means less light is available to illuminate the paper. Because paper with higher brightness levels effectively illuminate the paper, the inks on the print surface can reproduce a wider range (gamut) of colors.

Whiteness	Whiteness is a measurement of light reflectance across all wavelengths of light that comprise the full visible spectrum. It is determined by the whiteness of the pulp and fillers of the papers used to make the papers as well as any bleaching agents used. Papers that reflect a higher percentage of blue light have the highest whiteness levels. Papers that reflect a higher percentage of yellow light yield lower whiteness measurement values. **The light source in which the paper is viewed can affect how the whiteness is perceived**. If an optical brightener has been added to make the paper look whiter, the paper will look bright in the UV light outdoors but dull indoor if the indoor light source doesn't emit UV light.
Shade	The shade of paper (true white, natural white, bright white, cream white) describes subtle differences in color within the visible spectrum. It is typically measured with the same CIE LAB model used in other color-sensitive industries, such as paint manufacturing. A true white shade reflects the total color spectrum equally. A natural white (cream white) has a warmer, slightly yellowish tint because it absorbs the blue and cooler colors of the spectrum. Books, training manuals and other long text documents are printed on natural or cream white papers because they are easier on the eyes A bright white shade absorbs the warmer colors and reflects more blues or cooler colors. Bright white papers have a high blue reflectance level and a clean, white appearance. Bright white papers are best for high-contrast images, including fine text and sharp lines of monochrome maps, schematics, and drawings.

Understand standard print sizes.

Below are U.S. and international standard sizes for technical drawings and office documents. To minimize the need for trimming prints, the manufacturers of wide-format rolls of paper take these standards into account.

U.S. Architectural Drawings		
ARCH A	9 x 12 inches	228.6 x 304.8 millimeters
ARCH B	12 x 18 inches	304.8 x 457.2 millimeters
ARCH C	18 x 24 inches	457.2 x 609.6 millimeters
ARCH D	24 x 36 inches	609.6 x 914.4 millimeters
ARCH E	36 x 48 inches	914.4 x 1219.2 millimeters
ARCH E1	30 x 42 inches	762 x 1067 millimeters
U.S. Engineering Drawings		
ANSI A	8.5 x 11 inches	215.9 x 279.4 millimeters
ANSI B	11 x 17 inches	279.4 x 431.8 millimeters
ANSI C	17 x 22 inches	431.8 x 558.8 millimeters
ANSI D	22 x 34 inches	558.8 x 863.6 millimeters
ANSI E	34 x 44 inches	863.6 x 1117.6 millimeters
ANSI F	28 x 40 inches	711.2 x 1016 millimeters
ISO Drawing Sheet Sizes		
A0	33.11 x 46.81 inches	841 x 1198 millimeters
A1	23.39 x 33.11 inches	594 x 841 millimeters
A2	16.54 x 23.39 inches	420 x 594 millimeters
A3	11.69 x 16.54 inches	297 x 420 millimeters
A4	8.27 x 11.69 inches	210 x 297 millimeters
Other Common Sizes		
Letter A	8.5 x 11 inches	215.9 x 279.4 millimeters
Legal	11 x 14 inches	279.4 x 355.6 millimeters
Ledger/Tabloid	11 x 17 inches	215.9 x 431.8 millimeters
Letter B+ (Super B)	13 x 19 inches	330.2 x 431.8 millimeters

Consider using eco-friendly papers.

In response to customer requests and advances in recycling, many paper manufacturers are committed to making higher quality papers in a more environmentally conscious way.

Some people believe eco-friendly bond paper will be too rough or flimsy for detailed technical drawings. As the demand for eco-friendly printing materials has increased, manufacturers have invested a lot of time and money in improving the quality of papers made entirely or partially from recycled materials.

While there is no standard definition of what makes paper eco-friendly, Freedom Paper only sells eco-friendly bond papers that are smooth, uniform, and capable of holding the ink density that maps, engineering drawings and architectural renderings require.

When you buy paper products that are certified by the Forest Stewardship Council (FSC), you can be assured that the wood pulp used to make the paper came from a paper manufacturer who is committed to protecting forest habitats, planting more trees than they harvest and taking steps not to displace native peoples or harming wildlife.

To qualify for the FSC-certified label, the FSC requires the products to undergo a "chain-of-custody" assessment that traces the path of the product from the forest to the manufacturer to the merchant. FSC chain-of-custody certification verifies that FSC-certified material is identified or kept separated from non-certified material throughout the supply chain.

The FSC also asks paper manufacturers to submit management plans that describe the scale and intensity of logging operations and plans for preserving the long-term health of the forest.

Many manufacturers of eco-friendly papers also meet standards established by the Sustainable Forestry Initiative (SFI) to promote responsible forestry practices. The SFI is an independent, non-profit organization that promotes measures to protect water quality, biodiversity, wildlife habitat, species at risk and forests with exceptional conservation value.

The SFI also has chain-of-custody requirements. This assessment tracks wood fiber through the different stages of production, noting how much of the manufactured paper comes from certified lands, how much post-consumer recycled content is used and how much responsibly sourced fiber is used.

The quality of eco-friendly paper is no longer an issue.

The wood pulp comes from sustainably managed forests.

The papers are manufactured in an environmentally conscious way.

Major manufacturers of eco-friendly bond papers use processes that consume fewer trees, less water and less fuel and reduce greenhouse gas emissions. In general, approximately 60% fewer raw materials are consumed in making eco-friendly bond plotter paper.

Eco-friendly papers contain about 30% post-consumer waste.

Eco-friendly bond plotter paper includes pulp from recycled paper. The term "post-consumer waste" that has previously been printed, recovered from the waste stream, de-inked and then re-used to make all new rolls of paper. The use of recycled paper to make new rolls of paper minimizes the number of trees that must be harvested.

If your company is striving to reduce its environmental footprint, consider eco-friendly packaging as well. The papers are shipped in boxes made from recycled fibers and sourced from responsibly managed forests.

Know the difference between a heavyweight presentation paper and an inkjet photo paper.

A heavyweight presentation paper has the opacity, whiteness, thickness and ink-receptive coating to handle some blocks of color and small photos. A heavyweight presentation paper is fine for reproducing PowerPoint presentations or documents that combine text with charts and small photos.

The coatings on photo papers are specifically developed to handle the heavier ink loads required to mix cyan, magenta, yellow and black ink droplets to create the range of colors and tones needed to reproduce image details.

Use an inkjet photo paper if the accuracy of photo reproduction is critical or if the photo fills most of the page.

Use a self-adhesive paper if you plan to mount the print to a foamboard or presentation board.
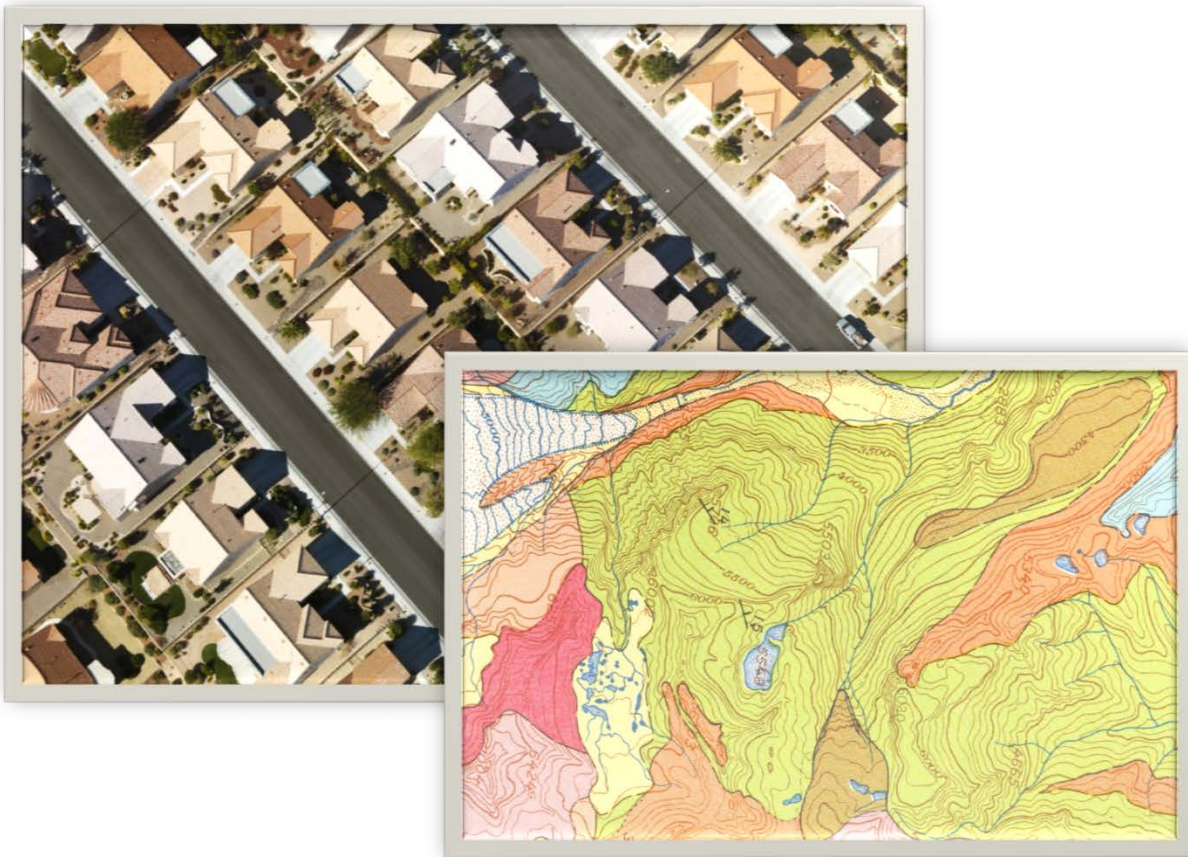
What types of papers and films are best for specific applications?

Photo-quality renderings	Heavyweight presentation paper Premium coated bond Inkjet photo paper
Monochrome (black) line drawings, text documents	Uncoated bond
Everyday drafts and drawings	Uncoated bond Coated bond
Imposition proofs	Two-sided coated paper
Presentations and proposals	Heavyweight presentation paper
Economy posters and signs	Heavyweight presentation paper
Overlays	Clear film Translucent vellum
Archival drawings	Vellum Mylar film
Photographs	Inkjet photo paper Premium coated bond
Water-resistant maps and drawings	Mylar film (with pigment black inks)
Markable drawings	Mylar film
GIS maps	Heavyweight presentation paper Inkjet photo paper

Other frequently asked questions

Which materials are best for archival prints?

Use inkjet vellum to print drawings that will be preserved for generations. Unlike the bond papers made from wood pulps, vellum is a 100%-cotton-rag paper. Cotton-rag papers don't have the acids or lignins that can cause papers to yellow over time.

Mylar and polyester films are also more resistant to degradation caused by light, humidity, temperature and exposure to environmental pollutants.

What should I know about printing on clear films?

If you plan to print clear film on an HP Designjet 500, 2000, or 3000-series printer, you should be aware that the optical sensor on these models are unable to sense the edges of the film. Thus, you must either use an interleaving sheet beneath the film or order one of our clear films that have edge strips that can be removed after the film has been printed.

How should I store and handle the unprinted papers?

Store unused media upright and in its original packaging. Before loading it on the printer, allow it to acclimate to the environment in your print room. Avoid touching the print surface of the paper.

Glossary of Terms Related to
Technical Drawing Papers and Films

Acid-free: A pH neutral paper manufactured without acid in the pulp. To be designated acid-free, the paper must have a pH between 6.5 and 7.5. Acidity in the paper can cause the documents to deteriorate over time.

Anti-Curl Coating: A thin coating on the back of inkjet photo media to keep it flat after printing.

Archival: Having enduring value. To make **archival prints**, all materials must be suitable for long-term storage in climate-controlled facilities. **Archival papers** are free of substances (acids, lignins, optical brightening agents) that can cause the paper to become brittle or yellow over time. **Archival inks** are resistant to humidity and light-induced fading.

Basis Weight: The weight in pounds (lbs. or #) of 500 sheets of a standard basic size (e.g. 11 x 17 inches or 24 x 36 inches). In Europe, paper weight is measured in grams per square meter (gsm or g/sm). Gsm is based on the gram weight of a hypothetical square meter of a particular paper. The gsm weight doesn't vary by sheet size.

Bond Papers: Economical papers for everyday drawing, writing, copying, and office printing. Types include: uncoated bond papers; premium coated bond papers; eco-friendly bond papers; opaque bond papers; and heavyweight presentation bond papers.

Brightness: A measurement of the light reflectance of the paper using a standard wavelength of blue light. Brightness is a more narrow measurement of light reflectance than whiteness. A brightness level above 100% indicates the use of fluorescent whitening agents (optical brighteners). Both brightness and whiteness affect how colors appear on the page.

Caliper: A measurement of the thickness of a material. Inkjet paper is typically measured in mils (one-thousandth of an inch). The measuring tool is also called a caliper.

Core Size: The diameter of the cardboard tube on which the paper has been rolled. Longer, heavier rolls of paper are typically sold on 3-inch cores. Papers for aqueous wide-format inkjet printers are typically sold on 2-inch cores.

Dimensionally Stable: This term refers to a sheet that remains the same size during printing, finishing, handling and display. It resists shrinking or stretching due to heat or water.

Film: A flexible, plastic material that has been specially treated to accept ink or toner. Compared with paper, films lay flatter after printing and are more resistant to tears, stains, punctures, and humidity. Films don't become brittle or yellow over time. Films can be clear, translucent, or opaque.

Matte: A flat, non-reflective surface finish.

Mil: A unit of measurement equal to one-thousandth of an inch. Mils are typically used to compare the thicknesses of different types of paper.

Microporous Coating (also known as porous or nanoporous coatings): A semi-rigid, ink-receptive coating comprised of millions of microscopic particles held together with a chemical binder. When the ink flows into the ultra-tiny spaces between the particles, the surface of the print feels instantly dry to the touch. With pigment inks, a microporous coating provides a high level of water and fade resistance. The colorants in dye inks remain susceptible to water damage, fading, and exposure to airborne pollutants.

Mylar Film: A dimensionally stable, plasticized polyester film that doesn't discolor or disintegrate when wet. It feeds through the printer without stretching. Both sides of prints on double matte Mylar films can be marked up and revised with erasable markers.

Opacity: The degree to which the paper or film blocks the transmission of light through the substrate.

Photo Paper: A paper with an ink-receptive coating that can handle the heavier ink deposits required for black-and-white and color photographs.

Resin-Coated (RC) Photo Paper: Paper is sandwiched between two layers of a polyethylene (plastic) film before the ink-receptive coating is applied. The plastic coating adds to the glossiness and lay-flat properties of the print and makes the paper more resistant to folding or creasing damage.

Self-Adhesive Paper: A paper with a pressure-sensitive adhesive on the back. When the protective release liner is peeled away from the back of the printed paper, the print can be easily mounted on a clean, smooth, flat surface.

Solventless/Non-Solvent: A type of vellum manufactured without acids that can cause the paper to yellow or fade over time.

Swellable Coating: An ink-receptive coating in which synthetic and/or natural polymers swell when aqueous inks are applied. The coating encapsulates the colorant in the ink, protecting it from airborne pollutants. Swellable coatings are most often used with dye inks, because pigment particles are too large to be absorbed into the coating. The clarity and transparency of swellable coatings helps maximize the vividness of color and darkness of black areas. Although swellable coatings can provide excellent image quality and rich color, they are not durable. Prints can fade, run or scratch when exposed to the elements.

Taped Roll: Wide-format rolls of paper that are taped to the core for use in Xerox engineering copiers. Other brands of copiers don't require taped rolls.

Translucent: The light shining through the material is diffused, making it possible to partially see the colors and shapes of what is behind it.

Transparent: This optically clear material supports the unobstructed transmission of light so that all details are visible.

Vellum: Strong, high-quality, translucent acid-free paper developed to impersonate calfskin parchment. The best quality vellum paper is 100% stretched cotton, sealed with vegetable minerals. This produces a strong, flat absorptive surface for archival-quality masters.

Water-Resistant: Materials that are water-resistant can withstand spills, sprays, or drips that are quickly wiped away. Unlike waterproof materials, water-resistant materials aren't designed to be totally immersed in water or remain submerged in a puddle.

Whiteness: The whiteness of the paper is a measurement of the light reflected across the full visible spectrum. Whiteness is determined by a combination of the natural whiteness of the pulps and fillers used to make the paper and the use of bleaching agents such a chlorine.

Glossary of Printing and Copier Related Terms

Aqueous Dye/Aqueous Pigment Inks: An aqueous ink uses water to carry the colorants (dyes or pigments) to surface of the inkjet paper. Dyes are ultra-small molecules that dissolve in water. Pigments are particles of colorants composed of tens of thousands of molecules. They remain suspended in the water. Pigment inks are more fade-resistant and water-resistant than dye inks.

Banding: The appearance of vertical or horizontal lines in an inkjet print. Banding can be caused by clogged printheads, misaligned printheads, or the use of the wrong print settings for a certain ink and paper combination. On older printers, non-uniform banding can occur in portions of a color image or graphic that include gradients (the transition from one tone to another). Older printers weren't designed to process the same amount of color image data as newer models of printers.

Bleeding: The uncontrolled migration of ink on the paper.

Cockling: The puckering of a printed sheet caused by excessive humidity or ink oversaturation.

Density: A measure of how well a printed photograph or text absorbs light. Density affects the appearance of black text, lines, and image shadow areas.

Gradients (Gradations): Steps of transition between two colors or between black and white. Gradations are created by mixing percentages of a dominant color and secondary color. Newer, higher-resolution printers with 6 or more colors of ink produce smoother gradations than older-model printers with 4 colors of ink.

Head Crash: The collision of an inkjet printhead with the surface of the paper. A head crash can occur if the substrate is too thick to feed through the printhead height setting. Or, if the media has too much ink, the paper can curl and strike the printhead. Head crashes can damage both the printhead and the print.

Ink-Receptive Coating: A surface coating on the paper that controls how the droplets of ink spread and dry on the paper. The formulation of the coating influences aesthetic properties (such as gloss uniformity, dot gain, and color density) and print durability (resistance to abrasion, fading, and/or water). The ink-receptive coating is different than a protective coating, which is applied after the printed image has fully dried.

Laminating Film: An adhesive-backed clear film applied to the surface of inkjet prints or copies to add rigidity and/or protection from exposure to pollutants, water, or abrasion.

Mottling: An uneven appearance of colors in a print, particularly in solid areas. It can be caused by unevenness of the print surface or differences in ink absorption properties.

Piezo and Thermal Inkjet Printheads: A piezo printhead uses oscillations of electrically stimulated piezoelectric crystals to force ink through the inkjet nozzles. A **thermal printhead** uses heat to expel the inks through the nozzles of the printhead. Heat causes the fluids to expand and be forced through the nozzles. Thermal printheads typically cost less and can be replaced by printer users.

Plotter: A computer-controlled device that writes line-drawing data on paper or film. The first plotters for CAD printer used pens. Today, the term typically refers to a wide-format printer used to print drawings.

PostScript: A software printer description language used in page layout programs that combine text and line drawings (vector graphics) with images (raster graphics).

Toner: This mixture of ultra-fine powdered chemicals gains an electric charge when it comes into contact with a rotating drum. Toners include heat-sensitive plastic powders, iron oxide, pigments, and other ingredients.

Xerography: A dry printing or copying process in which toner is transferred from an electrically charged plate to paper or film, then fused to the material with heat.

Wide-Format / Large-Format: Many people use the term wide-format and large-format interchangeably. But the term **wide-format** typically applies to printers that can handle papers from 17 to 64 inches wide. Printers that can handle rolls larger than 64 inches fall in the **large-format** category.

Acronyms

ANSI: American National Standards Institute

BIM: Building Information Modeling

CAD: Computer-Aided Design or Computer-Aided Drafting

CMYK: Cyan, Magenta, Yellow and Black. (The ink colors in four-color process printing.)

DPI: Dots per Inch

FSC: Forest Stewardship Council

GIS: Geographic Information Systems or Geospatial Information Systems

GSM: Grams per Square Meter

HPGL: Hewlett Packard Graphics Language file

ICC: International Color Consortium

ISO: International Organization for Standardization

LCD: Liquid Crystal Display.

LED: Light Emitting Diode

MFP: Multi-Function Printer

OBA: Optical Brightening Agents

PCW: Post-Consumer Waste

PDF: Portable Document Format

PSA: Pressure-Sensitive Adhesive

SFI: Sustainable Forestry Initiative

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