CPSA ARTopics
Explorations for the Creative Mind

Paper: A Primer for Artists in Search of the Best Surface

Deborah Maklowski, CPSA, CPX

Humans have been using what we would call "paper" for about 5,000 years; it is considered one of the most significant inventions in the history of human civilization. In the 21st century, paper can be made from harvested or recycled plant fibers or from polymers (plastic).

How Paper is Produced

Plant-fiber paper is produced in three ways: by hand, by mold, or by machine. Nearly all artist-grade papers are either hand- or mold-made. Handmade papers are created in the same way they have been for centuries, by soaking and beating the fibers together in water and scooping the resulting pulp into a handheld, frame-and-mesh mold to create individual sheets, which are then pressed and dried.

Mold-made papers work on the same principle, but the handheld mold is replaced by a large, mesh-covered cylinder which rotates through a vat, pulls the pulp out in a long, continuous sheet, and places it on a felt-covered belt for pressing and drying. Machine-made papers rely on huge Fourdrinier machines, which follow the same general process, only much faster. While a very few mills use Fourdrinier machines to make artist-grade papers, nearly all machine-made paper is produced for the non-art market.

Storing Paper

Ideally, plant-fiber (non-synthetic) paper should be stored flat, between acid-free boards to prevent accidental acid migration, at temperatures between 60° and 65° Fahrenheit (15° to 18° Celsius) and at 60% relative humidity. Temperature extremes can adversely affect a paper's weight, thickness, and rigidity, while excess moisture can lead to the growth of mold.

Framing Your Work

When framing work on paper, always use acid-free mats and backing boards, as well as molding made from sealed wood or from metal. Any acids in the mat board, backing board, or wood frame will migrate to the paper over time and turn it yellow and brittle, destroying the artwork.

Never use framing that sandwiches the artwork between sheets of glass or acrylic; always frame with a mat or with spacers. Not only can the unsealed edges of the "sandwich" allow dust and pollutants to reach the artwork, but it is also inadvisable to allow glazing to come in direct and prolonged contact with the artwork. For that reason, non-reflective ("frosted" or "non-glare") glazing should also be avoided.

Terms associated with paper are explained in the glossary section that follows.

A Paper Glossary

Acid-free

Describes paper that is either naturally acid-free or that has been chemically treated during manufacture to remove the lignin that over time will cause the paper to turn yellow and disintegrate (see "Lignin").

Acid migration

The transfer of acid from an acidic material, such as cardboard, masking tape, or wood, to a less acidic or pH-neutral material, such as acid-free art paper, through physical contact (see "pH").

Acrylic paper

Paper made for painting in acrylic that has been given a rough or canvas-mimicking texture during manufacture and then coated with an acrylic polymer to prevent paint absorption.

Archival

Originally used to designate materials of sufficient quality and authenticity to make them suitable for inclusion in an archive. In the art world it is generally applied to papers and other art-making surfaces that are strong and durable, free of optical brightening agents (OBAs), and are, or have been rendered, acid-free (see "Acid-free" and "OBAs").

Beating

The process of manipulating and pulping cellulose fibers in water, during which the fibers absorb water and are cut, shredded, softened, and bound together (see "Cellulose fiber").

Bristol board

A sturdy, multi-ply drawing paper created by layering thin sheets together with glue and then bonding them under pressure. It is available in vellum, smooth, and plate surfaces (see "Vellum" and "Plate").

Buffers

Chemicals such as calcium carbonate, talc and china clay which are added to wood pulp to neutralize acidic lignin and balance pH (see "Lignin" and "pH").

Cartridge paper

(UK) A generic term for artist-quality drawing paper.

Cellulose fiber

The primary component of non-synthetic paper. Sources include cotton, wood, hemp, linen, jute, ramie, straw, bamboo, and other plant material, along with recycled cloth (see "Rag" and "Synthetic paper").

Chain

See "Ingres paper."

Chlorine

Sometimes used to bleach fibers during paper manufacture. Most artist-grade papers are not bleached, however, as any residue left in the paper can discolor the fibers over time and make them brittle (see "OBAs").

Cold pressed

Paper pressed between cold metal rollers during manufacture, giving it a moderately bumpy surface texture. It is also referred to as "NOT" paper, meaning "not hot-pressed" (see "Hot pressed" and "Rough").

Cotton linters

The shorter cotton fibers that remain attached to the seed after the longer fibers are removed for making fabric. Linters are used in the manufacture of cotton artist-grade papers, often to supplement cotton rag. "Linter" is also the name of the machine that removes those shorter cotton fibers (see "Rag").

Cotton rag

See "Rag."

Couching

The term for removing the damp sheet of interlocked fibers from a handheld or cylinder mold and placing it onto the felt for further processing (see "Felt" and "Mold").

Cylinder mold

A large, wire-mesh cylinder central to the manufacture of mold-made papers. As the cylinder mold rotates through a vat of pulp (or "furnish"), the pulp collects on the mesh, which allows the water to drain out. The result is a continuous sheet sheet of closely bound, interlocked fibers that is pressed onto a felt-lined belt by a "couch" roller. The damp sheet is

A Paper Glossary: C–I

Cylinder mold *(continued)*

then processed though a series of felts and rollers to press, dry and cut the paper. Mold-made paper will generally have two genuine deckle edges on its long sides and two cut edges. Some mold-made papers may also have two pseudo-deckle edges instead of the cut edges (see "Couching," "Deckle edge," and "Furnish").

Deckle

In hand-making paper, a wooden frame that is placed over the frame of the mold to keep the pulp contained within the mold while the water drains through the screening. The fibers trapped between the mold's frame and the deckle form the deckle edge of the paper when it is dry (see "Mold" and "Deckle edge").

Deckle edge

As opposed to a cut edge, the irregularly-shaped edge of a paper sheet. Handmade papers will have four genuine (or "true") deckle edges, while mold-made papers, manufactured in long continuous sheets, will have two genuine deckle edges and two cut edges. Pseudo-deckle edges can also be created with cutting tools or water (see "Deckle" and "Cylinder mold").

Drafting film

A polyester sheet with a translucent matte surface on one or both sides created by a coating of amorphous silica particles dispersed in a resin. It is the matte coating that provides the tooth required for the adhesion of applied dry media. Drafting film is sometimes called "drafting vellum," although it is not vellum (see "Synthetic paper," "Tooth," and "Vellum").

Embossing

Pressing a specific texture or pattern into a paper while it is still wet; for example, canvas-textured papers are made by embossing.

Felt

A felted woolen pad used to remove excess water, compress the sheet fibers, and add texture to wet paper. The side of the paper that lies on the felt as it dries is referred to as the "felt side" and has a softer, more random texture, whereas the side of the paper that was in contact with the draining mesh is the "wire side," which can give that side more tooth and, in some papers, a distinctively patterned texture (see "Tooth").

Fourdrinier

Paper-making machines that use mesh conveyor belts to vacuum out excess water and a series of hot and cold rollers to press, smooth, texturize, polish, and dry the paper, which is produced in huge rolls. The Fourdrinier process is mainly used for making general-purpose papers, but there are still some mills that use them for fine art papers. The first Fourdrinier machine was built and patented in England in 1806 by the Fourdrinier brothers, based on the original design of Frenchman Nicolas-Louis Robert.

FSC

Forest Stewardship Council. The FSC label on wood-derived paper certifies that the wood from which it was made was sourced from sustainable forests (see "Wood).

Furnish

Collective name for the water-suspended mixture of cellulose pulp, sizing, buffers, and other additives that is processed to create paper; also called "stock" (see "Buffers," "Pulp," and "Sizing").

Gampi paper

See "Rice paper."

Gelatin

A protein made from animal collagen, used to size paper (see "Sizing").

Grain

See "Tooth."

GSM

Grams per square meter; see "Paper weight."

Hanji paper

See "Rice paper."

Hot pressed

Paper pressed between hot metal rollers during manufacture, imparting a very smooth texture to the surface (see also "Cold pressed" and "Rough").

Illustration board

Paper that has been glued and mounted under pressure onto a rigid, acid-free board.

Ingres paper

A generic term for a variety of mold-made papers having a "window-screen" texture on one side,

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Ingres paper *(continued)*

created by the cylinder's mesh. This pattern can be either subtle or pronounced. Ingres paper is sometimes referred to as "laid" or "laid and chain" paper, the "laid lines" being the visible ridges running the paper's length, and the "chain lines" being the visible ridges running across the paper's width (see "Cylinder mold" and "Pastel paper").

Kozo paper

See "Rice paper."

Laid paper

A paper having a distinctive pattern of horizontal and vertical ridges. Sometimes called "laid and chain" (see "Ingres paper").

Lignin

A complex biopolymer that binds together the cellulose fibers in plants. Since it is acidic and prone to degradation under ultraviolet light, lignin must be separated from the cellulose fibers and removed from paper pulp during manufacturing, first by soaking in a heated alkaline solution and then by the addition of buffering agents (see "Buffers" and Cellulose fiber").

Linen rag

See "Rag."

Linters

See "Cotton linters."

Lokta paper

See "Rice paper."

Mitsumata paper

See "Rice paper."

Mold (Mould)

A wooden frame over which a wire mesh has been stretched. In making paper by hand, the mold is dipped into a container of pulped cellulose fibers and pulled up. The deckle is placed on top of the mold, and the mold is shaken and tipped as the water drains out through the mesh. This creates a sheet of closely interlocked cellulose fibers which, when pressed and dried, becomes paper (see "Cellulose fiber" and "Deckle").

NOT paper

See "Cold pressed."

OBAs

Optical brightening agents. These are chemical additives used to make paper appear whiter and brighter. OBAs, however, are never used in making artist-grade papers, since they are prone to degradation under ultraviolet light and have a limited lifespan. For that reason, fine art papers, if not colored with added pigments, are a natural (or "traditional") white that is dependent on the color of the fibers from which they are made and on the type of sizing used (see "Sizing").

Oil paper

Paper made for painting in oil. The paper is hard-sized with an acrylic polymer to prevent its absorbing oil from the paint and then primed with an acrylic or oil primer to add texture (often mimicking canvas) and to modify the color and/or sheen (see "Sizing").

Paper weight

The thickness of a paper, described in one of two ways: either in pounds or in grams per square meter (GSM). In the U.S., measurement in pounds is more common. It is derived from the weight of a ream (500 sheets) of a paper in the paper's standard size. Since the standard size of paper varies widely from manufacturer to manufacturer, it is not possible to derive a useful comparison of the relative weights of different papers using the pounds measurement. However, the GSM weight of a paper, more common in Europe, does not reference or depend on the arbitrary standard size of a paper and is therefore a more accurate way to compare the relative weights of different papers.

Papyrus

The earliest known paper, from which our word "paper" is derived. In use in Egypt as early as 3100 B.C.E., papyrus was made by laminating together the pith fibers of the papyrus plant.

Parchment

Also known as vellum, parchment is a paper-like surface once made from processed animal skins, in use in Europe as early as the 13th century (see "Vellum").

Pastel paper

Paper that has been given a pronounced surface texture in order to grab and hold soft pastel. Pastel paper's rough surface is created either by impressing

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Pastel paper *(continued)*

texture into the wet sheet during manufacture (these are sometimes called "Ingres papers") or by applying a coating containing abrasive materials, such as pumice, marble dust, aluminum oxide, or polyester fibers, to a dry sheet. Pastel paper is also referred to as sanded paper (see also "Ingres paper").

pH

A measure of how acidic or basic (alkaline) a substance is. A scale of zero to 14 is used, with a pH of 7 being neutral. The lower the pH, the more acidic the substance is.

Plate

A paper surface that is extremely smooth and has a subtle shine.

Pulp

A fibrous slurry resulting from the soaking and beating of a wide variety of fibrous materials in water to soften, integrate, and bind together cellulose fibers (see "Beating" and "Cellulose fiber").

Rag

Paper made from cleaned, shredded, and pulped post-consumer textiles, generally cotton and/or linen. The longer fibers derived from recycled fabric make for a stronger paper that is more resistant to changes in temperature and humidity, and the fact that cotton and flax (from which linen is made) are naturally acid-free make rag papers preferred over wood-pulp papers.

Ream

500 sheets of paper in its standard size, as determined by the paper's manufacturer; from the Arabic word "rizma," meaning "bundle."

Rice paper

A generic term for a variety of Asian-sourced and -made papers. These include a bright white paper made from the so-called Rice Paper plant (Tetrapanax Papyrifer) found in Thailand and southern China; Lokta paper made from the Lokta bush (Nepal); Xuan paper made from a relative of the elm tree (China); and several types of paper made from the Kozo (mulberry) tree, including mulberry paper (Thailand), Washi, Shoji Mitsumata, and Gampi paper (Japan), Hanji paper (Korea), and Kozo paper (Japan, Thailand, South America). The long fibers of these plants are soaked, cooked, rinsed and hand-beaten to make extremely strong and durable papers.

Rough

Paper heavily textured by being pressed between woolen felts. The rougher the texture of the felt, the rougher the texture that is imparted to the surface of the paper (see also "Felt," "Cold pressed," and "Hot pressed").

Sanded paper

See "Pastel paper."

Shoji paper

See "Rice paper."

Sizing

A process that inhibits the paper's ability to absorb wet media. Sizing allows pigment to remain on the paper's surface and improves the adhesion of dry media. Internal sizing occurs when a sizing agent is added to the wet pulp, while external sizing occurs after the paper is dry, by dipping it in a vat, a process called "tub sizing." Papers described as "hard-sized" are sized both internally and externally and therefore are far less absorbent than soft-sized papers. Sizing agents include gelatin, wax, modified vegetable starch, and acrylic co-polymers (see "Gelatin").

Stock

See "Furnish."

Synthetic paper

A generic term for art surfaces made from materials other than cellulose fibers. These include surfaces made from polyester or extruded polypropylene pellets, as well as mineral paper (also called "stone paper" or "bio-plastic paper"), which is made from calcium carbonate bonded with high-density polyethylene resin. Synthetic surfaces have superior longevity compared to paper, since they are acid-free, non-yellowing, and dimensionally stable under changing temperature and humidity conditions (see "Cellulose fiber").

Tooth

The surface texture of a paper; also called "grain."

Tub sizing

See "Sizing."

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Vellum

Most frequently describes a paper that has a soft, minimally textured surface, in contrast to papers with a very smooth ("plate") or very rough surface. Historically, vellum was another name for parchment, a paper made from animal skin. For that reason, vellum can sometimes also refer to a modern, high-quality rag paper that imitates the color and surface texture of true parchment (see "Plate").

Washi paper

See "Rice paper."

Waterleaf

Unsized, highly absorbent paper (see "Sizing").

Watermark

A marking in the paper that identifies its manufacturer, created when wire or a relief image embedded in the felt thins the wet pulp as it is pressed so that, when the dry sheet is help up to the light, the translucent image is visible (see "Felt").

Weight

See "Paper weight."

Wire side

The side of the finished paper that was formed in contact with wire mesh during manufacture (see "Cylinder mold," "Felt," and "Mold").

Wood

One of the main sources for paper. Both hardwood (deciduous) and softwood (indeciduous) trees are used, the shorter fibers of the former providing bulk and the latter's longer fibers imparting strength.

Xuan paper

See "Rice paper."

Sources:

"Paper," a 2007 article written for CPSA by Rhonda Farfan, Executive VP of Consumer Standards Emeritus and product research director, 1991–2005

Paper Guide, *2021, an invaluable resource for those interested in fine art papers, compiled and published by Jackson's Art Supplies, London, and available on the web at jacksonsart.com*

Deborah Maklowski is an accomplished artist in colored pencil, acrylic, pastel, and mixed media, who began studying drawing and painting with private instructors at the age of nine. She holds a Bachelor of Arts degree from Virginia Commonwealth University and maintains her professional development through workshops with nationally known instructors, networking with her fellow artists, and a focused studio and plein air practice. Deborah has earned both CPSA and CPX signature status with the Colored Pencil Society of America. She served on the CPSA governing board as president from 2018 until 2022, and also held positions on the board as product research director and corporate relations director. Her award-winning work has been juried into many CPSA exhibitions and numerous other national and regional exhibitions and plein air competitions, and is included in private collections across the U.S. Deborah also teaches introductory and advanced colored pencil classes and workshops in central Maryland.