

WATERMARK PAPERMAKING AT EASTERN FINE PAPER

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MILL IN BREWER, ME, HAS BEEN MAKING FINE PAPERS FOR MORE THAN A CENTURY

LOCATED ON THE PENOBSCOT RIVER IN BREWER, ME, Eastern Fine Papers has been making paper since 1895. The site was originally used for a lumber mill built by John Brewer (whose name was taken by the town fathers) in 1771. Today Eastern Fine Paper runs three fourdrinier paper machines, two specialty coating machines, and associated finishing equipment. Eastern produces a variety of specialty grades and employs approximately 450 people. A significant portion of their production is dedicated to watermark grades.

The practice of watermarking was begun by European papermakers to identify the particular trade organization to which the papermaker was affiliated. Thus it was a symbol of a skilled papermaking artisan. In the 1820s, the dandy roll was developed to allow the production of watermark grades on a continuous sheet. A wire pattern attached to the face wire of the dandy roll creates an impression on the forming sheet (the consistency at the dandy roll is usually in the range of 2% to 5%). As a result, the final sheet has thinner areas that are clearly apparent when the sheet is held up to the light.

While the watermark patterns of today tend to be more complex, the same principles apply. Today the use of dandy rolls and watermarks can serve several purposes. The presence of a watermark on fine paper creates an impression of stability and quality. The watermark also offers a means of preventing fraudulent copies from

being made. Even in this age of highly sophisticated copying machines, a true watermark produced with a dandy roll cannot be duplicated. For this reason, security papers and documents use watermark grades. The use of dandy rolls enhances formation, and can also improve felt side printability. At Eastern, dandy rolls are used for all production, only a portion of which is for watermark grades.



Changing a dandy roll is a relatively quick job

CREATING THE DANDY ROLL WATERMARK

At Eastern, the creation of a watermark dandy roll is a joint effort between the highly experienced individuals of Eastern and its supplier, Johnston Dandy Company. Once a request is received from a customer, this team goes about creating a

“patch.” This patch is used to create watermark handsheets. These handsheets are then reviewed and if approved by all concerned parties, the pattern is added to one section of a dandy roll to see how it performs on the paper machine. All of this can normally be accomplished in six to eight weeks.

The design of the patch and resulting dandy roll is truly a highly specialized craft. Considerations include the diameter of the wire and wire spacing, diameter of the dandy roll, and materials of construction. Larger diameter rolls cause more forward spray (so-called paddle wheel effect) which can disrupt formation. Larger diameter rolls are also more expensive and may require more costly mounting arrangements.



At the mill's loading docks



The Brewer mill's finishing area

At Eastern, the watermark dandy rolls fall into the range of 16 inches to 42 inches. The relative speeds of the dandy roll and the wire are critical and must be closely monitored. Eastern's dandy rolls are all equipped with drives and thus are not driven by the wire. The design becomes particularly challenging if the customer wants the watermark to appear in the same location on each sheet. Then, paper machine speed and dandy speed become especially critical. In all, Eastern maintains an inventory in excess of 200 dandy rolls.

Although watermarks can be produced on many kinds of paper, to produce top quality watermarks the paper needs to have a very fine formation. Poorly formed paper will produce a blurred, grainy, indistinct watermark. Eastern feels that the sawdust pulp produced by its nearby sister mill, Lincoln Pulp & Paper, is exceptionally good for enhancing formation.

A dandy roll can create various types of watermarks. Generally, these are classified as wire marks, shadow marks, or combination marks (wire and shadow marks). Wire marks are caused by a raised wire or a patterned surface which compress the fibers and give a lighter or white appearance when held up to the light. A recessed area in the pattern or wire will result in a thicker mat and a darker appearance. Thus, the name shadow mark.

Watermarks can appear on plain sheets embossed or "laid" sheets. Laid sheets have a ribbed or woven appearance created by the dandy roll. All of these combinations are produced by Eastern Fine Paper.

PAPERMAKING FACILITIES

Eastern Fine Papers produce, on average, 220 short tons per day. All grades have been produced with an alkaline pH for approximately the last 10 years. Speeds range from



Robert W. Sullivan, Eastern's vice president and resident mill manager at Brewer



Joseph H. Torras, Sr., Eastern's CEO and board chairman



Nana Barde, vice president of engineering

800 feet/min to 1500 feet/min, depending on grade and paper machine. Basis weights range from 27 to 140 pounds. Deckle width is 104 inches on No.1 PM, 105 inches on No. 2 PM, and 88 inches on No. 3. Watermark grades are produced on all three machines.

These paper machines are very flexible. As many as five grade changes per day may be made on one machine. Eastern produces some 250 different grades in a wide range of colors. Because all dyes are added at the fan pump and each paper machine has its own white water system, grade changes can be made "on-the-fly" without the need to dump stock. The dye system is computer controlled and there is an on-machine computer system for final shade control. These computer systems contribute materially to product uniformity and are all Y2K compliant. In addition, this capability has greatly reduced fiber losses, which offers obvious financial benefits and greatly reduced the solids loading to the waste treatment plant.

Quality receives top priority at Eastern. A parent roll can receive as many as 12 tests, including percent moisture, basis weight, caliper, smoothness, ash content, opacity, color, brightness, wax pick, air content, dirt count, and lint. These tests are run both on and off-machine. Each shift includes one individual whose main responsibility is color quality. Off quality rolls are stored and blended back into the stock prep system when that grade is next

run. The stock furnish is mainly the previously mentioned pulp from Lincoln, cotton linters, and purchased softwood kraft. Since the Lincoln pulp mill is fairly close, Eastern and Lincoln are considered integrated on site by the Company.

The pulp from Lincoln is unique. It is a roughly 50-50 combination of hardwood and softwood pulp made from sawdust. The federal government has determined that paper with at least 50% sawdust content qualifies as a recycled grade. Also, because of the sawdust content, the Lincoln pulp content contributes to improved watermark quality, printability, and smoothness to Eastern's grades.

The finishing facilities at Eastern include both folio and cut size operations and wrapping. Approximately half of the production is shipped in the form of rolls. The Brewer mill also maintains a warehousing facility, which enables Eastern to provide next day shipment of their standard grades to most eastern seaboard customers. These customers include printers, paper merchants, and other paper companies.

The Brewer mill also produces 60 to 70 short tons per day of various specialty coated grades and label release liners on two modern coaters. Practically all of the base stock for this operation is purchased paper, with only 10% to 15% produced at Brewer.

HISTORICAL MILESTONES

- 1771 John Brewer builds a lumber mill at the current site of Eastern Fine Paper.
- 1880s Lumber mill purchased by F.W. Ayer and a pulp mill added. Facility reorganized as Eastern Manufacturing Company.
- 1895 A paper machine is installed and paper production begins.
- 1901 Two additional paper machines are added.
- 1905 A rag pulp mill is built.
- 1914 Eastern purchases Katahdin Pulp & Paper of Lincoln, ME.
- 1939 Eastern Manufacturing reorganized and renamed Eastern Corporation.
- 1958 Eastern Corp. and Lincoln Pulp & Paper Co. become a division of Standard Packaging Corporation. Lincoln's kraft pulp mill is rebuilt and expanded.
- 1967 Eastern's sulfite pulp mill in Brewer discontinues operations.
- 1969 Eastern is purchased by the Eddy Paper Company Limited of Ottawa, ON.
- 1989 On April 18, 1989 Eastern is purchased by Joseph H. Torras, thus rejoining Lincoln Pulp & Paper as a sister company.
- 1990-1995 Alkaline papermaking instituted on all grades. All paper machines on computer control, including dye systems. No. 1 PM rebuilt. New warehousing and shipping facilities added. Environmental improvements completed.
- 1996 No. 2 PM undergoes major rebuild and upgrade.
- 1997 Both coaters rebuilt, a Will sheeter is added.



Vince DeCesere, papermaking superintendent, stands next to the mill's 42-inch dandy roll

UTILITIES

The Brewer mill originally had a 300 tons/day sulfite mill. This pulp mill was shut down in 1967, but the water treatment, steam, and electrical generation facilities continued to operate. Thus the current paper mill is supported by utilities which are much greater in capacity than is required for a paper mill of this size.

Fresh water is sourced from Brewer Lake and receives pressure sand filtration treatment. Effluent from the mill, which is normally 1.0 million gallons per day, is sent to a recently installed pretreatment gravity filter prior to being sent to a mill-municipal waste treatment plant. "This plant is located on land adjacent to the mill which was provided by Eastern. This has resulted in minimizing pumping and piping costs and has preserved space for any future waste treatment expansion," points out Nana Barde, Eastern Pulp & Paper's vice president of engineering. Solids from the gravity filter are dewatered in a screw press and incinerated in Lincoln Pulp & Paper's waste fuel boiler. Transportation of these waste solids to Lincoln is via returning pulp trucks. In 1995, Eastern received the Maine Wastewater Control Association award for the best industrial pretreatment facility in the state. Over a four year period, the mill reduced TSS 78%, BOD 59%, and flow by 15%.

Eastern has two Babcock & Wilcox boilers each of which operate at 130,000 pounds per hour at 600 psi. The boilers run on low (0.2%) sulfur oil. There are two turbine generators which are supplemented in the winter by 4160 V electricity purchased from Bangor Hydro-Electric. The mill operates at 575 V.

ORGANIZATION

Robert W. Sullivan is the vice-president and resident mill manager at Eastern. He is an engineering graduate from the University of Maryland and has been with the parent organization for 26 years, with the last 6 years as resident mill manager at Eastern. Sullivan is particularly proud of the people at the Brewer mill and their tradition of taking pride in their work. To ensure that only the best candidates receive employment offers, the company uses an application review committee comprised of three mill management staff and three union members. Many of the employees are second and third generation papermakers. Papermaking superintendant Vince DeCesere, for example, is a third generation papermaker. He recently received PIMA's 1999 Paper Mill Superintendent of the Year award. DeCesere's watermark background is critical in the design and operation of new watermark dandy rolls.

Sullivan is also proud of Eastern's safety record. Eastern's safety policy states that "the health and well being of each and every employee of Eastern Fine Paper, Inc. is our first concern. Our safety goal is to have every person work every day without suffering an accident of any kind." In 1997 Eastern received an award for "Effectiveness in Safety" at the annual state safety conference for reducing reportable injuries 60%.

Eastern Pulp & Paper Corporation is a privately owned company founded by Joseph H. Torras, Sr., currently the chief executive officer and board chairman. He has a BS degree from Yale and an MBA from Harvard. Torras previously served in several management positions at St. Regis Paper, as executive vice president of the Brown Company in Berlin, NH, and as president of the Premoid Corporation. In keeping with the family tradition, his son, (Pepe) Joseph H. Torras, Jr., is the president and chief operating officer of Eastern Fine Paper and a director of Eastern Pulp & Paper.

In 1989 Torras purchased Eastern Fine Paper from the Eddy Paper Company of Ottawa, ON. He believes the future of watermark grades is "excellent for those who are in it for the long haul and who are dedicated to highly specialized grades." He is confident that Eastern Fine Paper is particularly well positioned, given that it is basically an integrated operation through the parent company's ownership of the pulp mill in Lincoln, and that they have learned to take advantage of the unique properties of Lincoln's pulp. Eastern Fine Paper's strategy is to continue to improve on quality and service in producing unusual and high quality products for medium-sized markets. TJ

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EXAMPLES OF WATERMARKS AT TAPPI



number of watermarks are on display and in collections at TAPPI headquarters in Norcross, GA. Many of the samples donated to the Association show portraits of historical figures, including Leonardo da Vinci, Richard Wagner, Pope John Paul II, Albert Schweitzer, and several U.S. Presidents. Shown here are watermarks depicting Charles Lindberg, Harry S Truman, Will Rogers, and Albrecht Dürer. A sample dandy roll shows wire impressions for a number of well-known watermarks.

