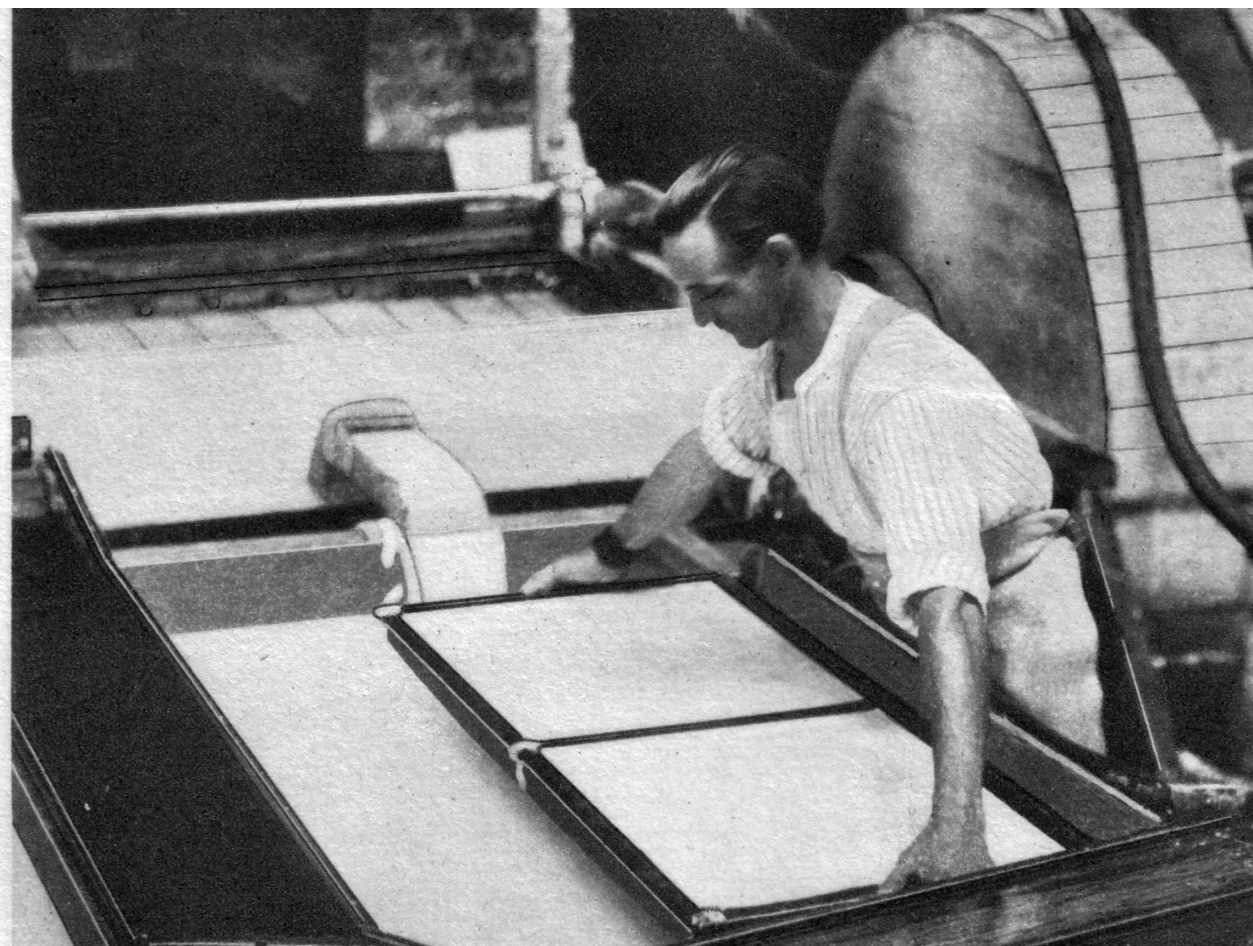


Aspects of Paper



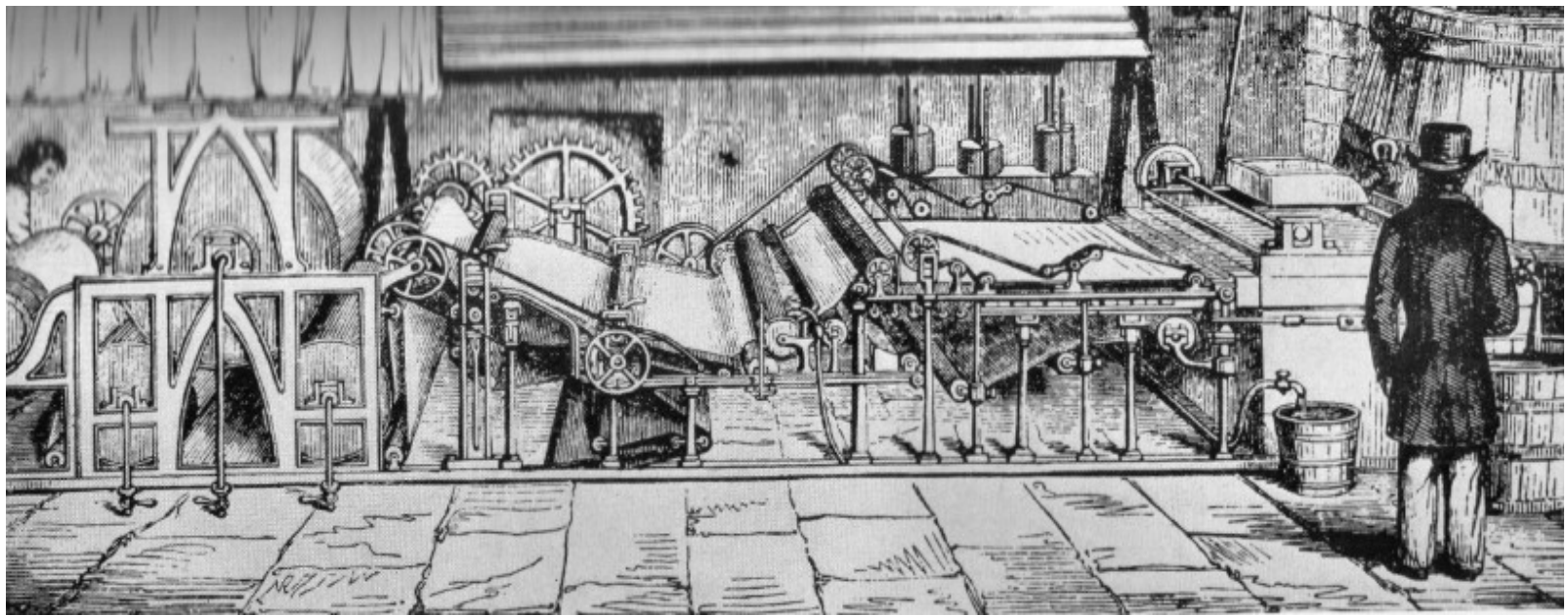
sappi

paper and people you can trust



sappi

paper and people you can trust

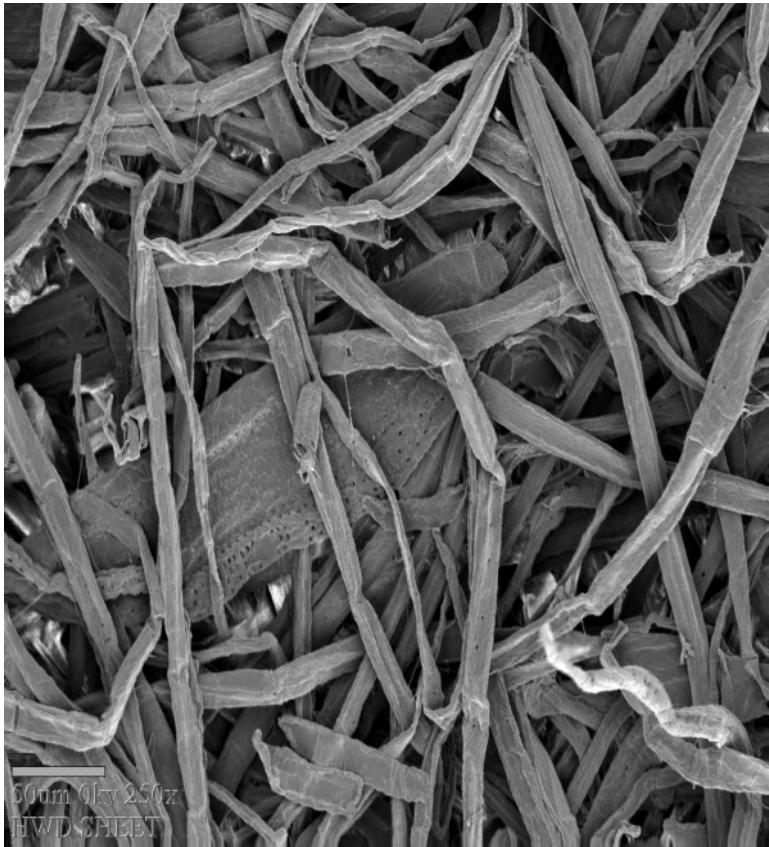






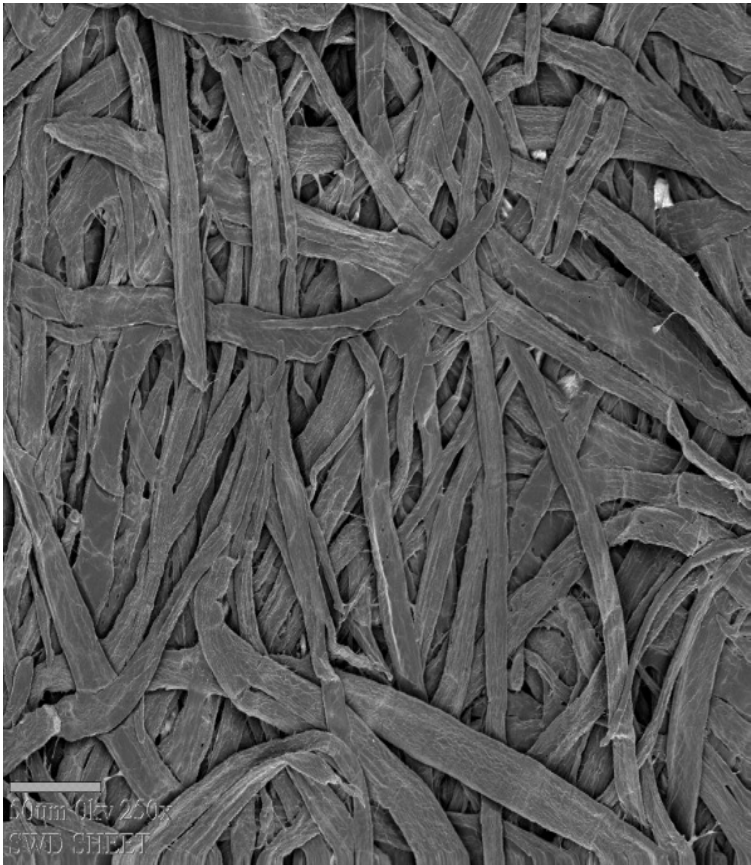
bus2064 www.fotosearch.com

Base Sheet: Hardwood Fibers



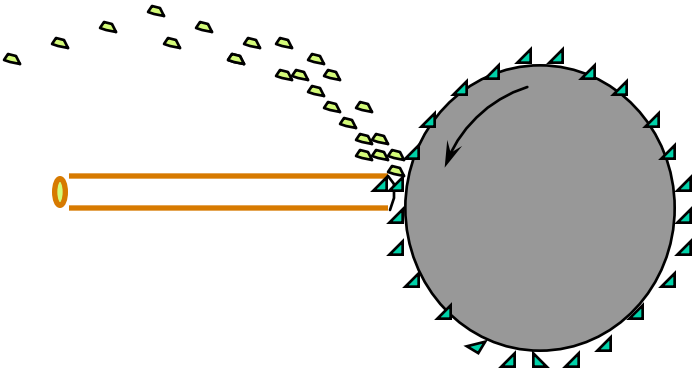
- **Species:**
 - Oak
 - Maple
- **Short & Stiff Fibers**
- **Fill**
- **Smoothness**

Base Sheet: Softwood Fibers



- **Species:**
 - Pine
 - Spruce
- **Long & Flexible Fibers**
- **Strength**
- **Foldability**

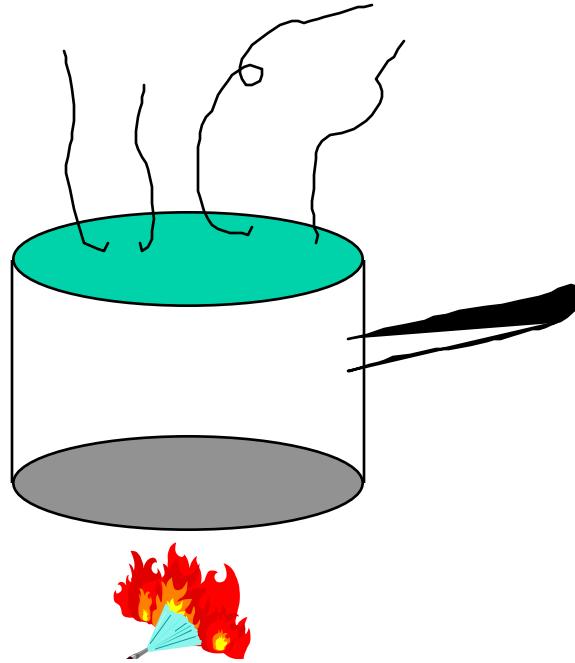
CHIPS





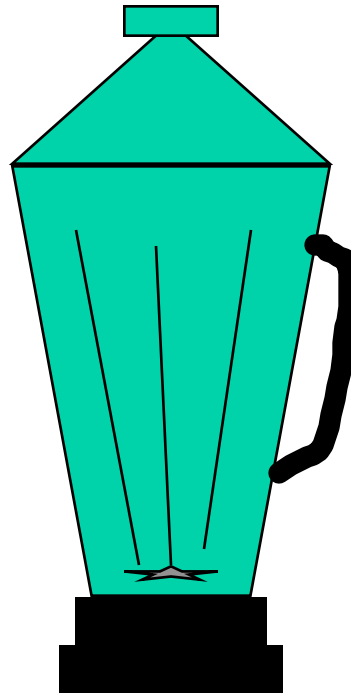
x19225662 fotosearch.com

Cook



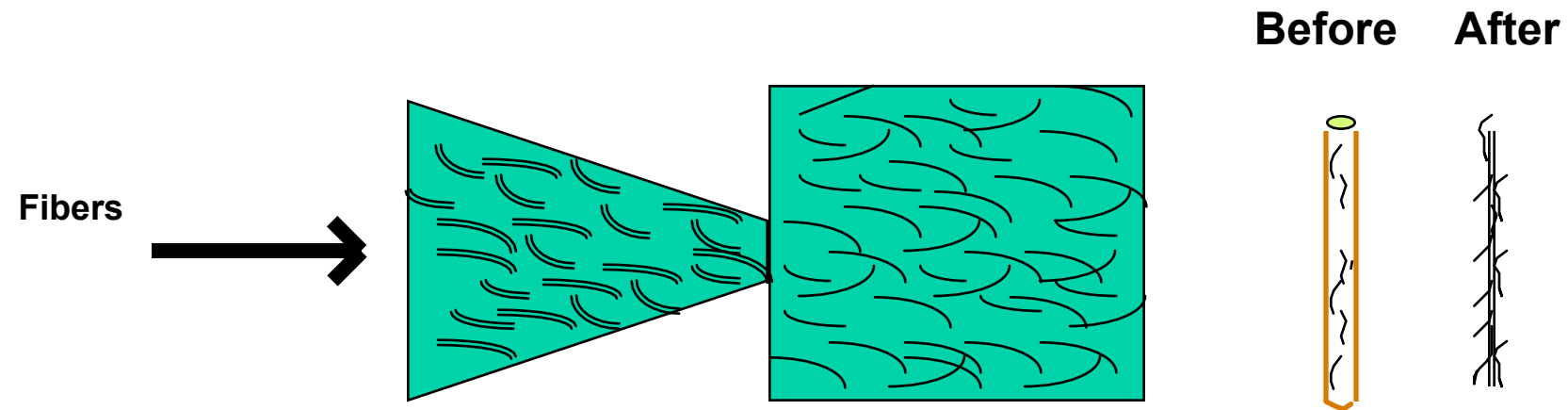
Removes the “Lignin” that glues fibers together

Beat



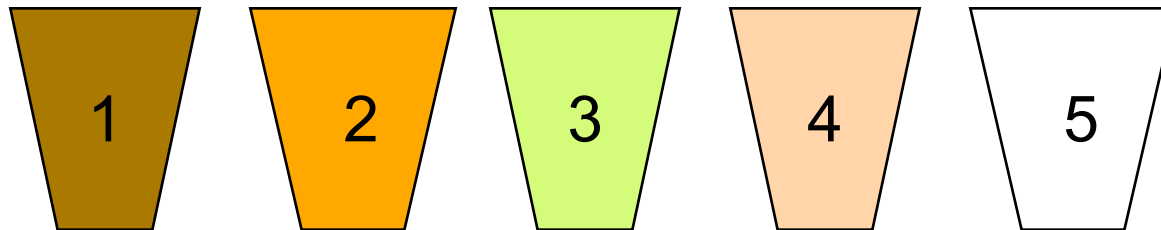
Breaks the pulp into single fibers and fibrillae that are better suited for paper formation.

Refine



Flattens fibers to make them better suited for papermaking

Bleach



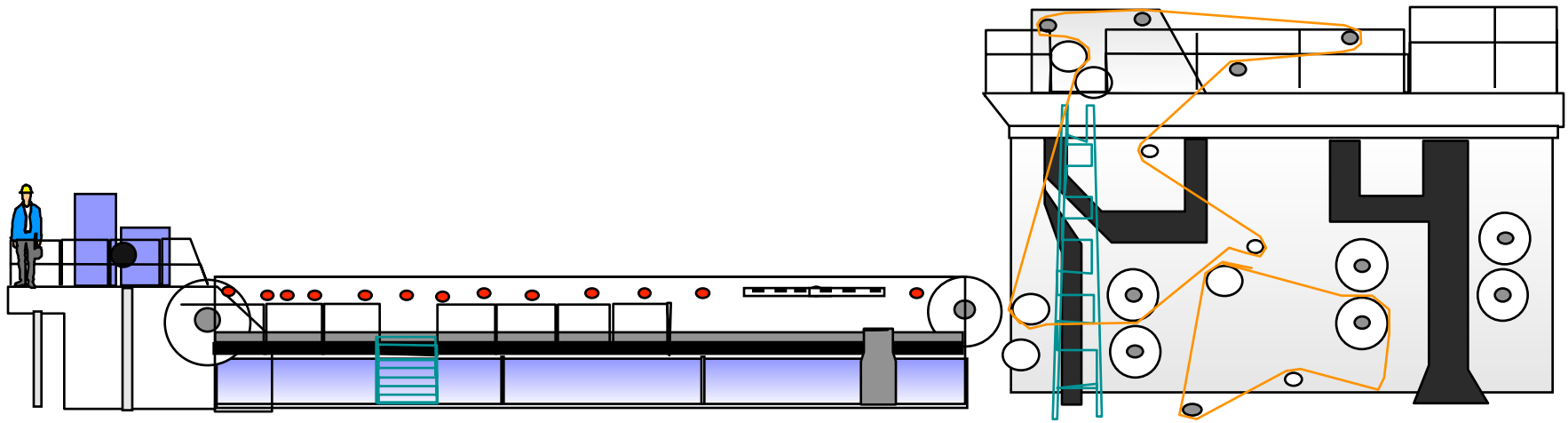
Five stage bleaching process which utilizes chlorine dioxide and an enzymatic process

Base Sheet Formation: Furnish



- **99% water**
- **Pulp**
- **Dyes**
- **Pigments**

Fourdrinier Paper Machine



FOURDRINIER

PRESS SECTION

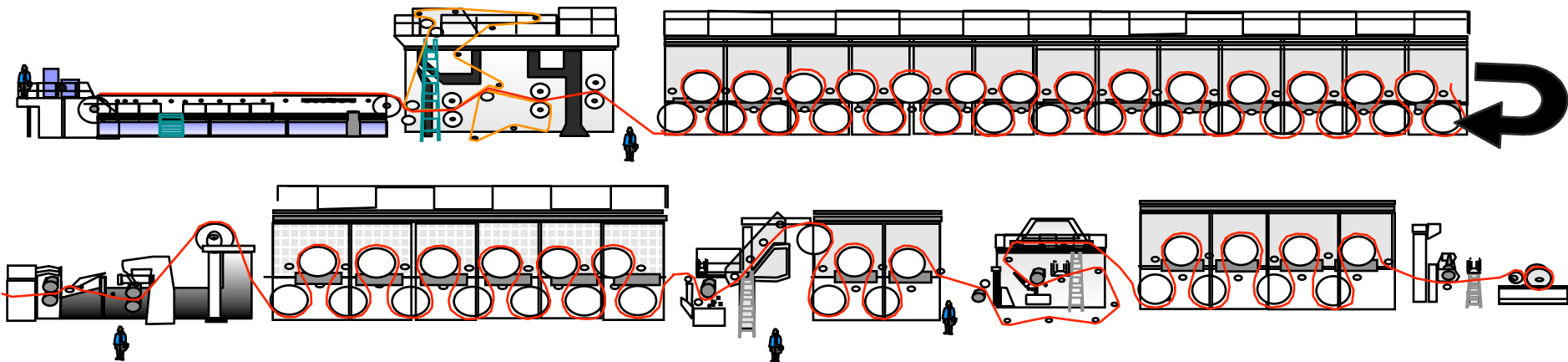
Base Sheet Formation: The Wet End



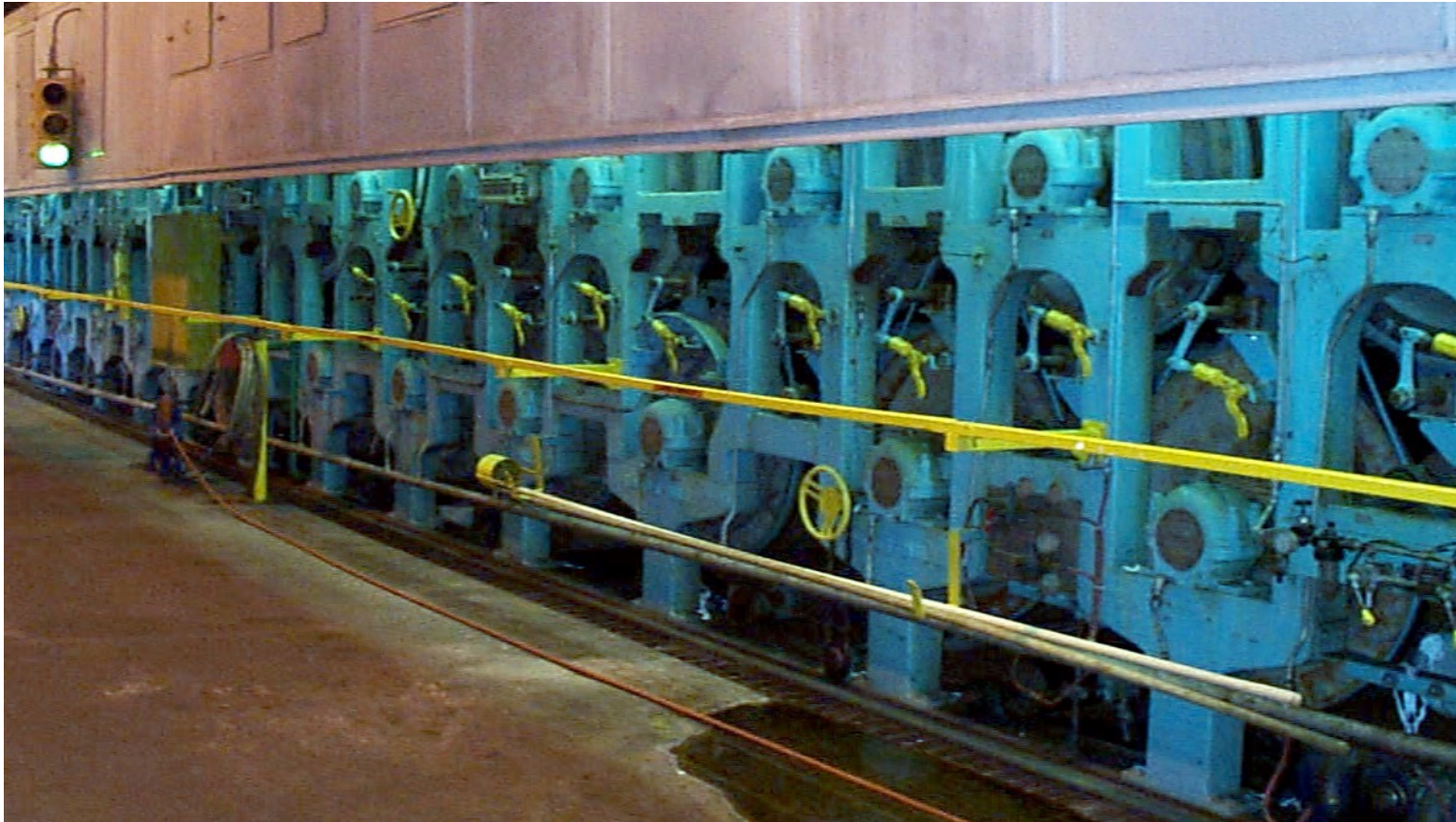
The Wire:

- *Conveyor-like belt of fine mesh wire.*
- *Serves as the table upon which the paper is formed.*

Fourdrinier Paper Machine



Base Sheet Formation: The Main Dryer Section

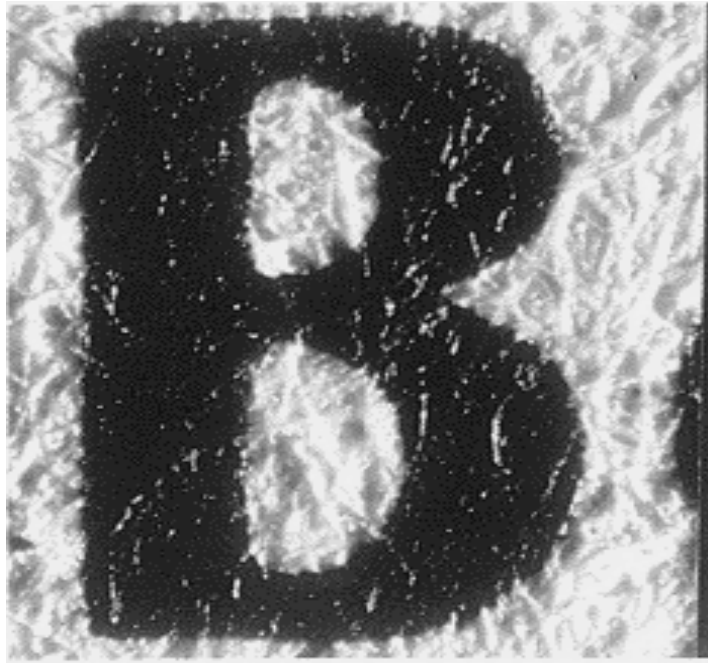


Largest section of the papermaking machine

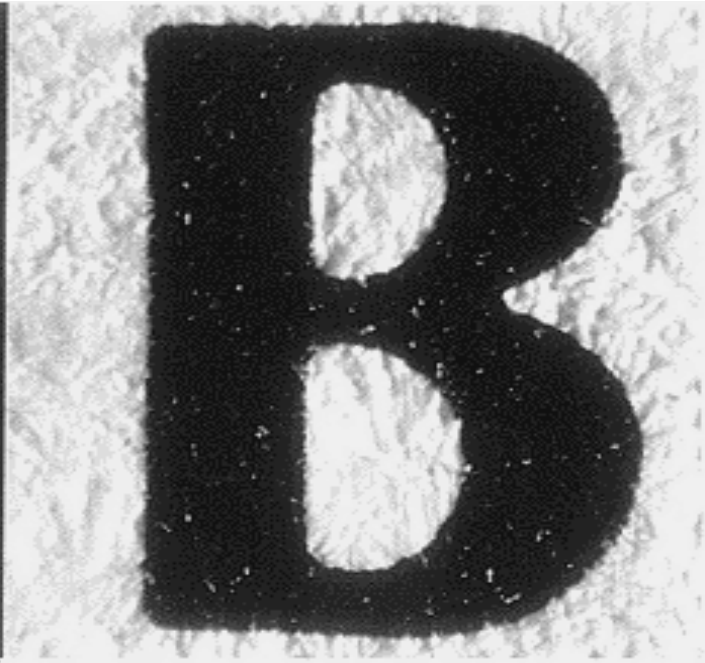


x11766550 fotosearch.com

Coatings: Why do we add coatings?



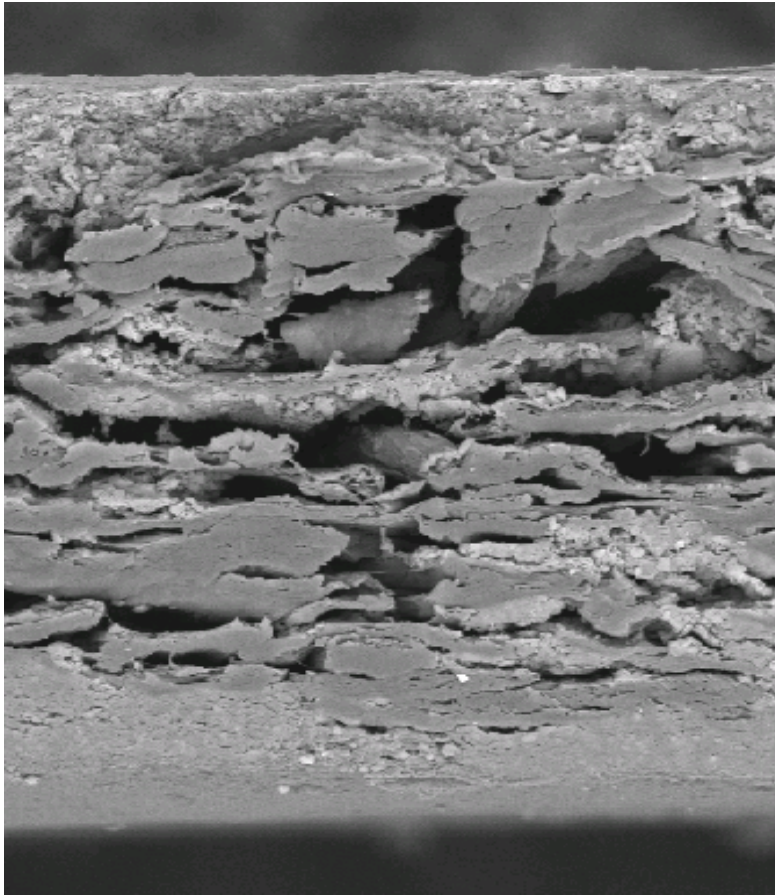
Uncoated Paper



Coated Paper

PRODUCT ATTRIBUTES:

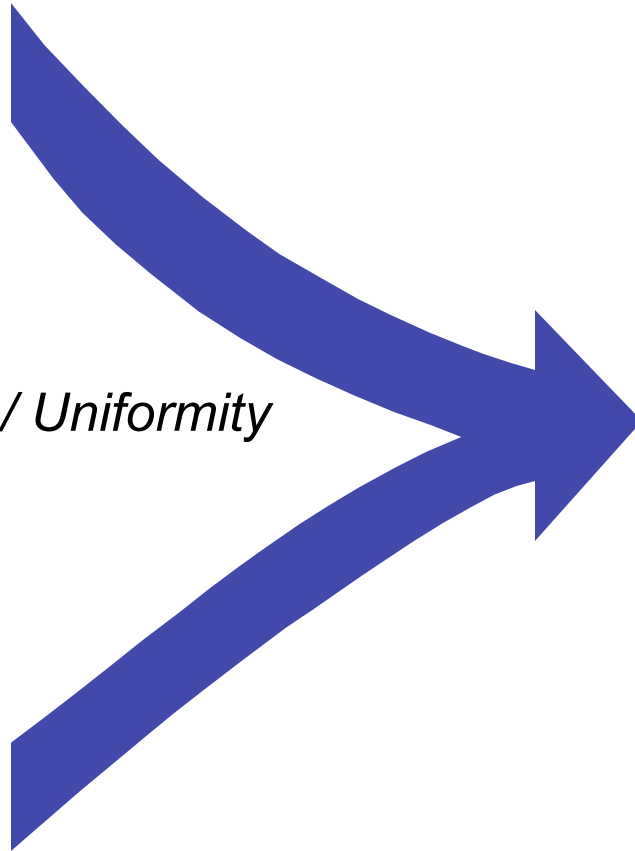
Fiber vs. Coating - Balance is Key



- **Fiber is the skeleton**
 - provides bulk
 - provides stiffness
 - provides opacity
- **Coating is the skin**
 - smoothes the surface
 - base for printed detail
 - delivers color accuracy
 - impacts printed ink gloss

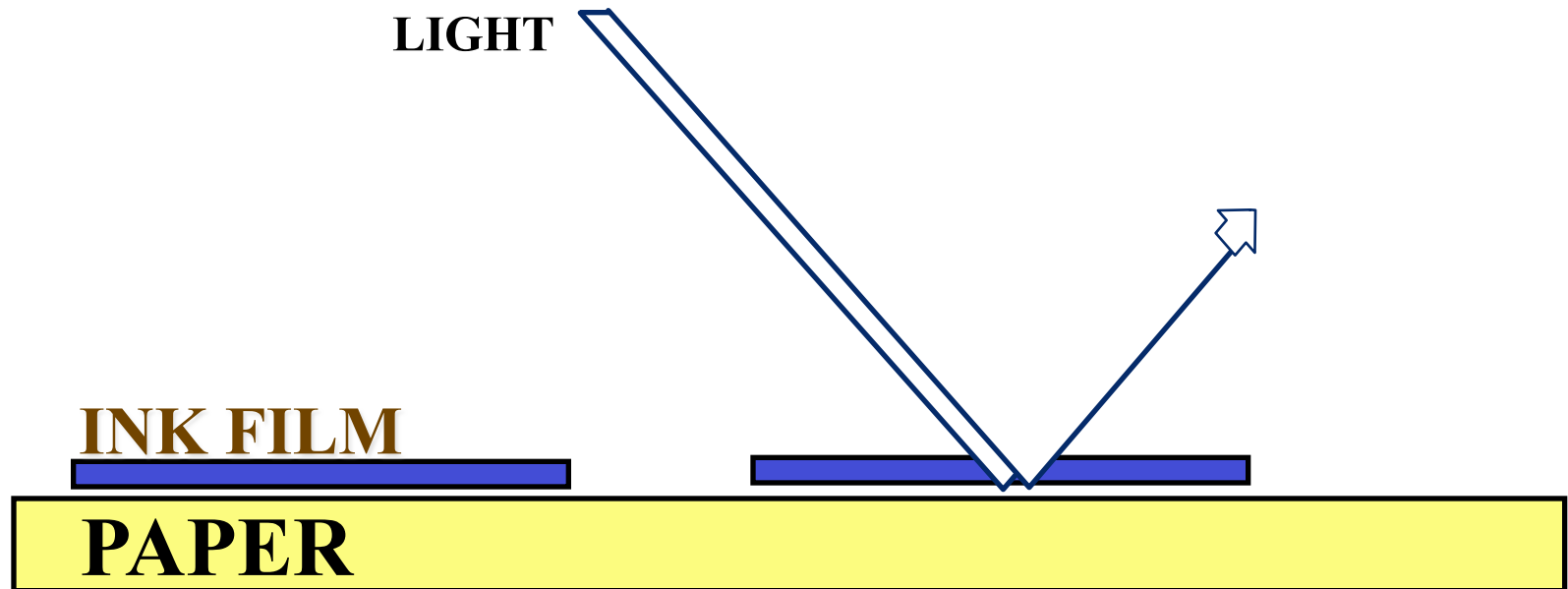
Characteristics of Coated Paper that Affect the Printed Image

- Brightness
- Shade
- Opacity
- Surface – *Smoothness / Uniformity*
- *Bulk*
- *Grain direction*



**Blend of
features
that affect
the printed
image**

BRIGHTNESS



- Paper is the Light Source for transparent inks
- The brighter the paper, the brighter your inks will appear
- Highlights will be only as bright as your paper

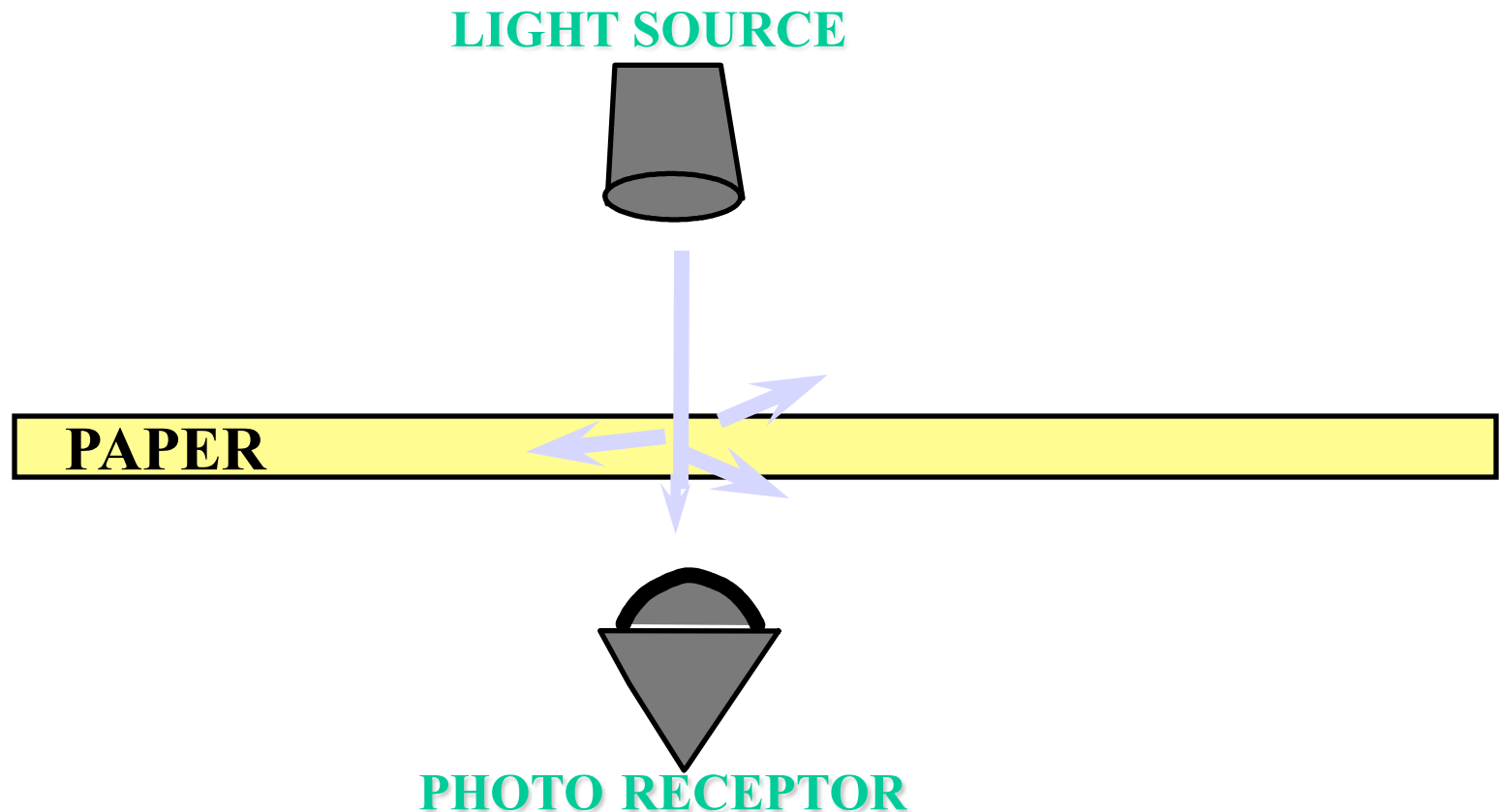
SHADE

Shade =
Visual Whiteness



OPACITY

THE PERCENT OF LIGHT ABSORBED BY A SHEET



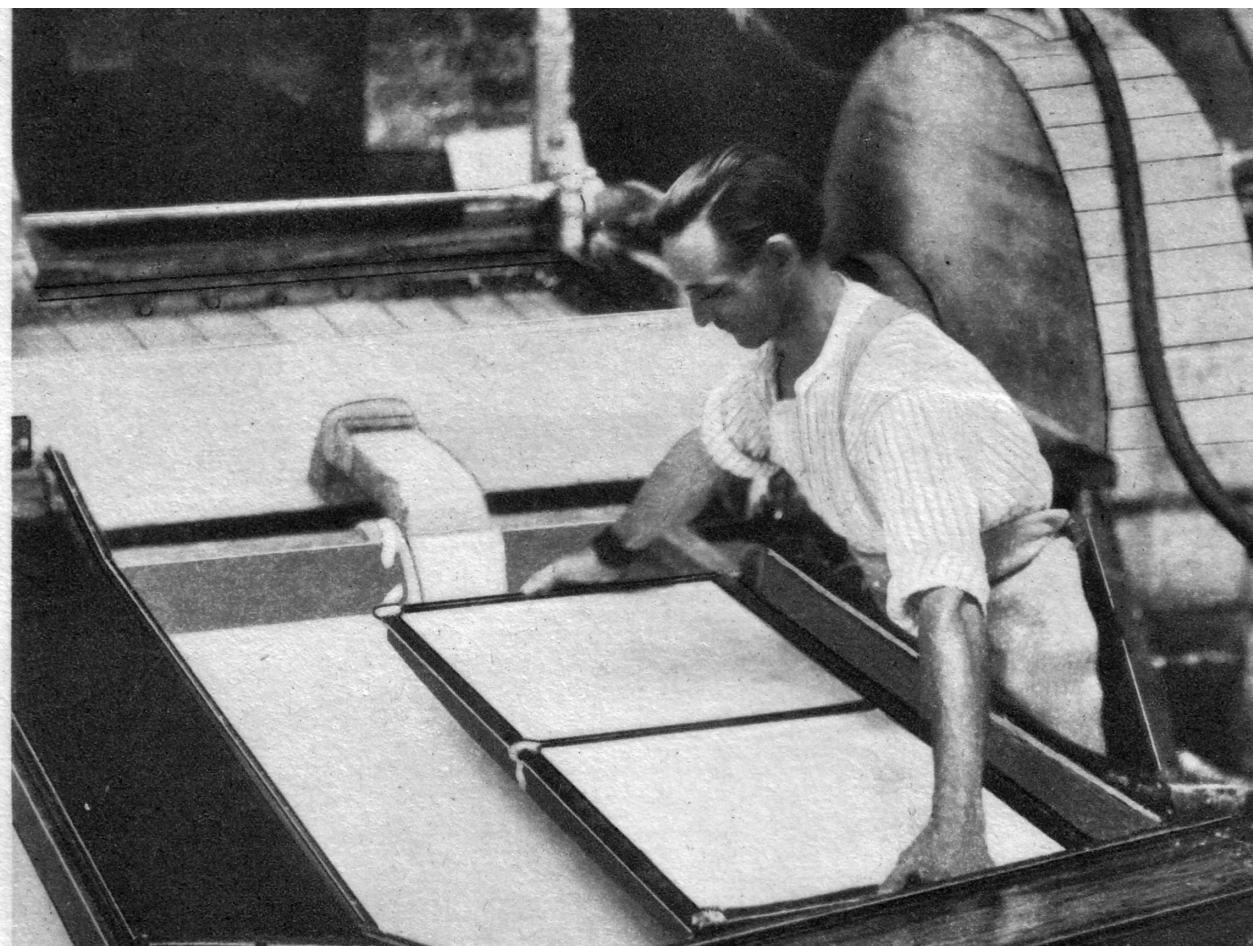
SURFACE

SURFACE UNIFORMITY / SMOOTHNESS

- Ink Film Continuity
- High Printed Ink Gloss
- Better Color Reproduction and Sharper Image Detail

HOW MANY COLORS DO YOU SEE?





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paper and people you can trust

Paper Math

- Basic Size-the size assigned by industry standard to determine basic weight
- Basic weight-the weight of 500 sheets of a specific grade of paper in the basic size.
- Caliper (Thickness-Micrometer-Mic)= 1/1,000 inch

BASIC SIZES

- Bond=17 x 22—374 Square Inches
- Offset=25 x 38—950 S.I.
- Board=24 x 36---864 S.I.
- Cover = 20 x 26—520 S.I.

Paper Math

- M Weight—the weight of 1,000 sheets of a given size and type.

i.e 23 x 35-136M 80# Smooth Offset

M weight = $\frac{L \times W \times \text{basis weight} \times 2}{\text{Square inches of basic size}}$

$$\frac{23 \times 35 \times 80 \times 2}{960} = 136$$

Paper Math

Why do we care ?

Is it a carton a skid a truck or a rail car?

Carton= approx 150 LBS

Skid = approx 1100 LBS to 2500 LBS

Truck = approx 40,000 to 44,000 LBS

Rail Car = approx 120,000 LBS

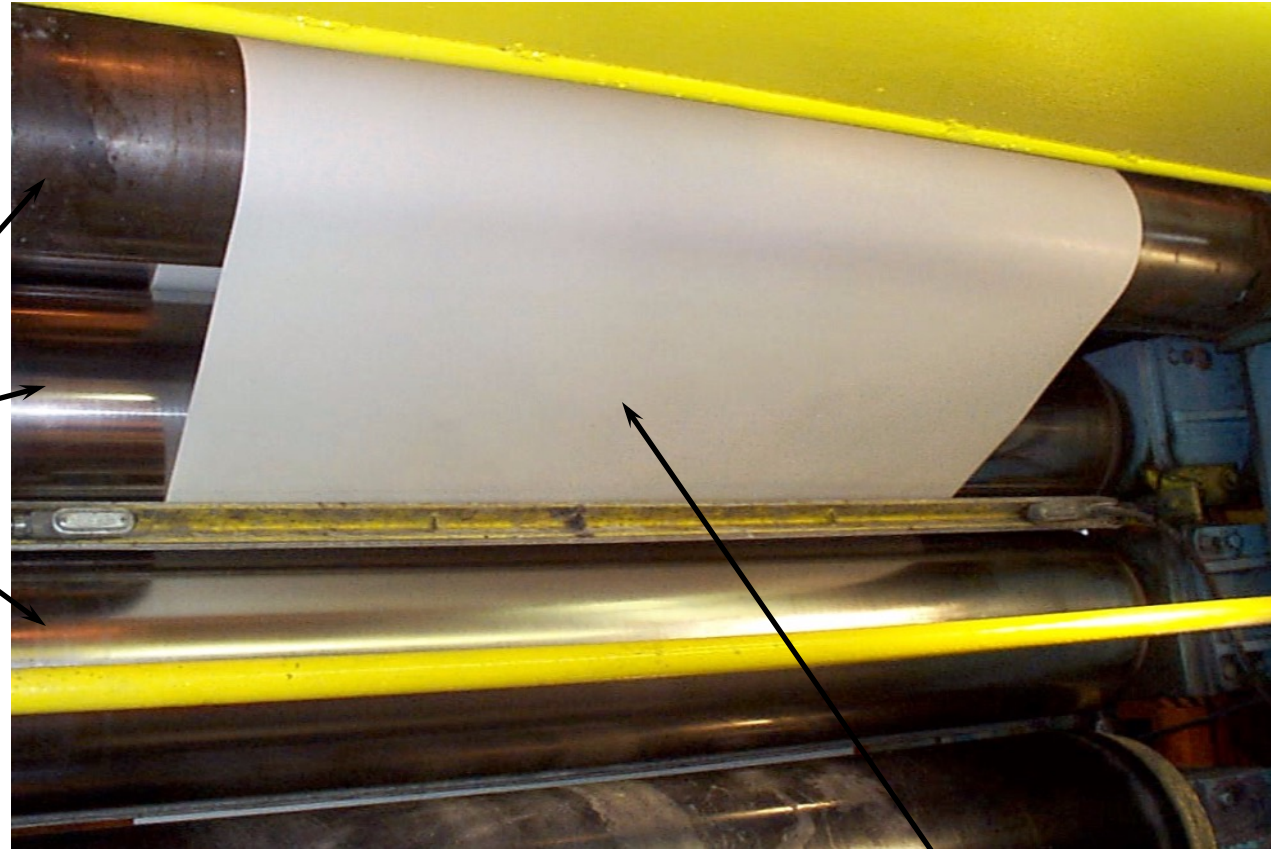
PAPER FINISHES

How is a finish applied?

Paper Finishes: How is a finish applied?

Supercalender

**Calender
Rolls**

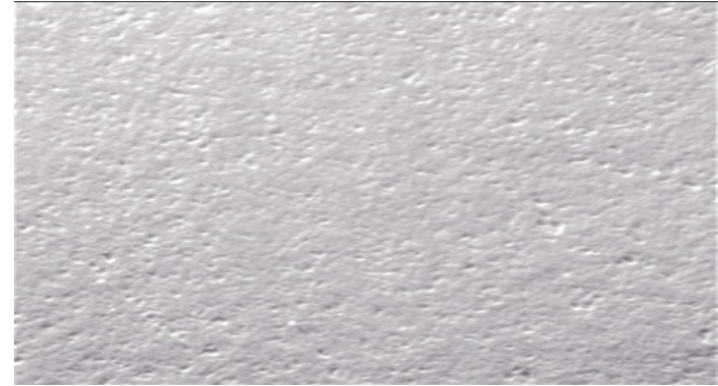


Paper

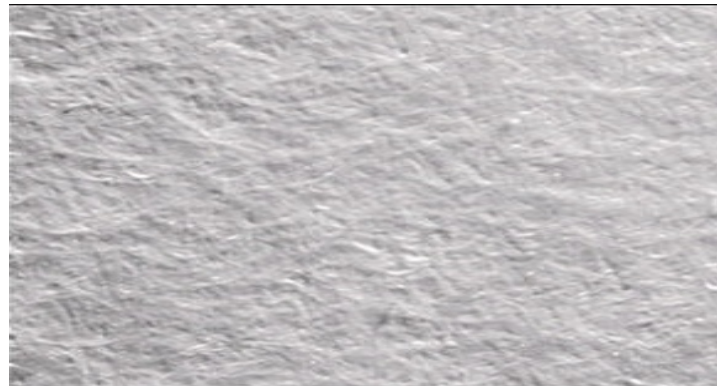
COATED PRODUCT CONSIDERATIONS: FINISHES



Gloss Finish



Silk / Dull Finish



Matte Finish

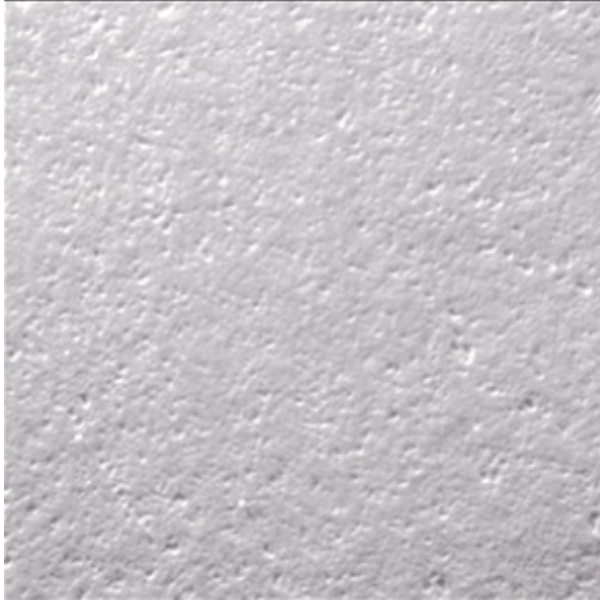
Gloss Finish Attributes



[photo micrograph at 25x magnification]

- **Smoothest, hardest, least porous, and most level surface offering**
- **Highest potential for accurate and concise dot reproduction**
- **Especially good for reproducing images of hard, shiny objects such as cars and glassware**

Silk & Dull Finish Attributes



[photo micrograph at 25x magnification]

- **Offers moderate paper gloss**
- **Controls light scatter**
- **Allows for smooth, flat, even ink lay and excellent readability**
- **Especially good for fine art, glassware, fabric, skin tones, detail**

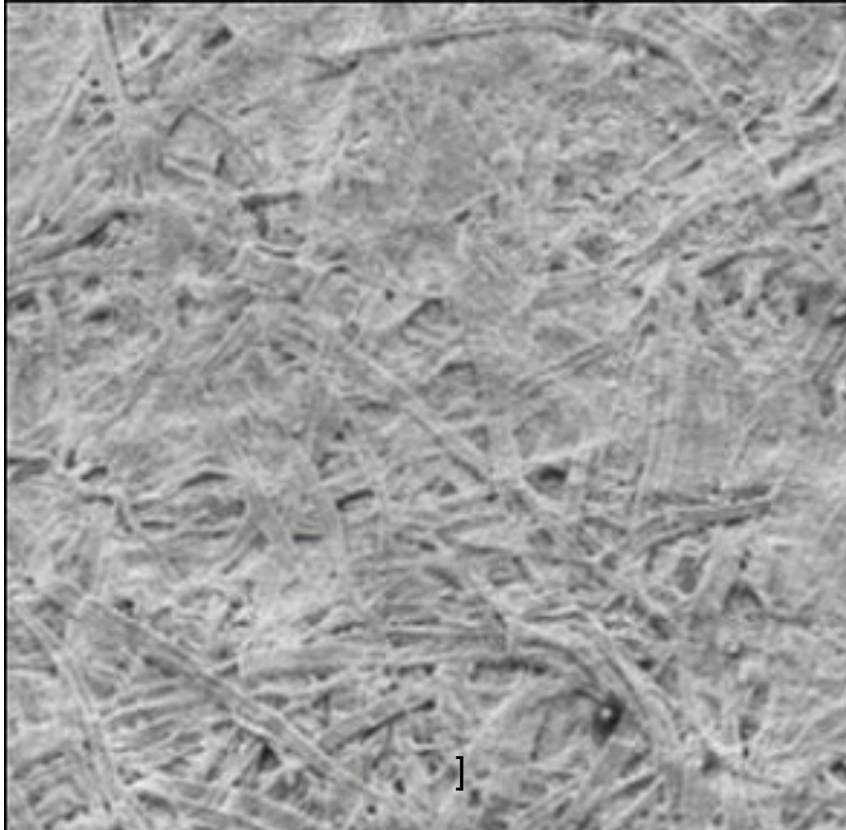
Matte Finish Attributes



[photo micrograph at 25x magnification]

- **Scatters light and retains a soft, “toothy” feel**
- **Highest bulk & stiffness of coated surfaces**
- **Look and feel of uncoated with the print reproduction benefits of coated**
- **Maximizes readability with minimal surface gloss**
- **Permits handwriting**
- **Especially good for soft images such as illustrations, art reproductions, fabric**

UNCOATED PRODUCT CONSIDERATION: FINISHES



- **SMOOTH**
- **WOVE**
- **VELLUM**
- **EMBOSSSED**

Uncoated Finish Attributes

- **Smooth:** Smooth is the result of the paper passing through sets of rollers during papermaking. This process is known as calendaring.
- **Wove:** Wove is an even finish in uncoated paper with a slight texture made by a felt roller covered in woven wire.
- **Vellum:** Vellum has an eggshell appearance that is even and consistent, but not as much so as a smooth finish. Vellum is one of the most popular uncoated finishes and has a high ink absorbency rate.

Uncoated Finish Attributes

Embossed

- Cockle:** Cockle simulates characteristics of handmade paper with a wavy, rippled, and puckered finish. The effect is obtained by air-drying the paper under minimum tension.
- Felt:** Felt is a soft texture on uncoated paper created during the papermaking process with either a felt-covered roller or rubber roller with a felt pattern. It can also be accomplished as an offline process.
- Laid:** Laid has the appearance of translucent lines running horizontally and vertically and is produced during the papermaking process with a special roller that creates a pattern in the wet paper.
- Linen:** Linen resembles linen cloth and is usually produced after papermaking as an offline embossing process.

Sustainable Forestry Management Standards



The Programme for the Endorsement of Forest Certification Schemes

- Regional approach (advantage for European forestry structure)
- More accepted by forestry owners
- Raw material theoretical available
- By area the dominant worldwide scheme



Forest Stewardship Council

- International scheme that is well known accepted by most NGO's
- Aimed for large timber companies managing vast forestry areas where forestry legislation does not exist, is weak or insufficiently enforced.



Sustainable Forestry Initiative

- Certifications for North America
- Managed by Sustainable Forestry Board (SFB)
- New 2005-2009 Standard issued Jan 2005

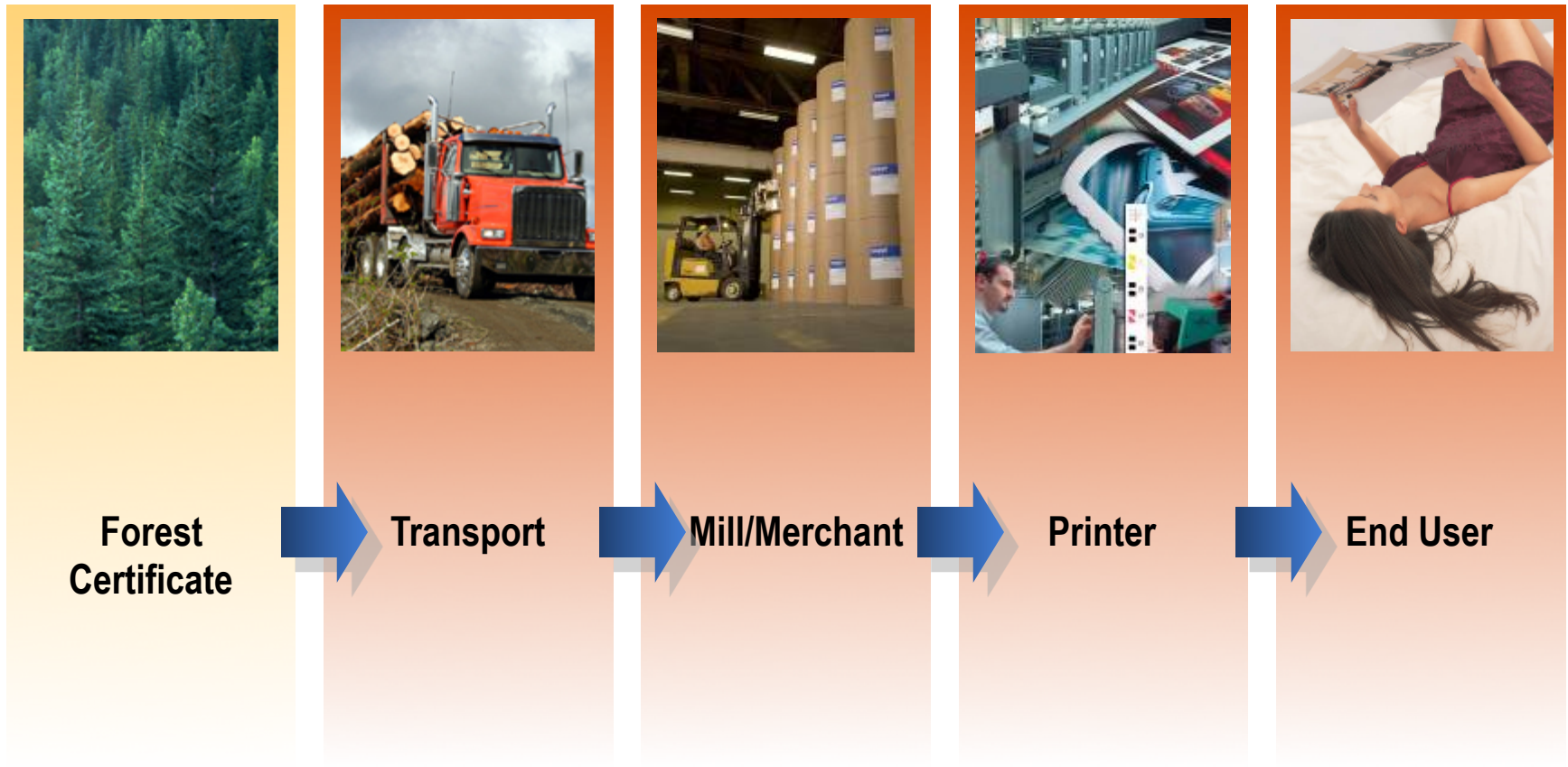


CSA

- Canada's National SFM Standard
- 1st published 1996, revised Dec 2002
- New revision process underway for 2007 version of standard

Chain-of-Custody

A 3rd-party verified unbroken trail of accountability that confirms that the product is made from wood from certified sustainable forests

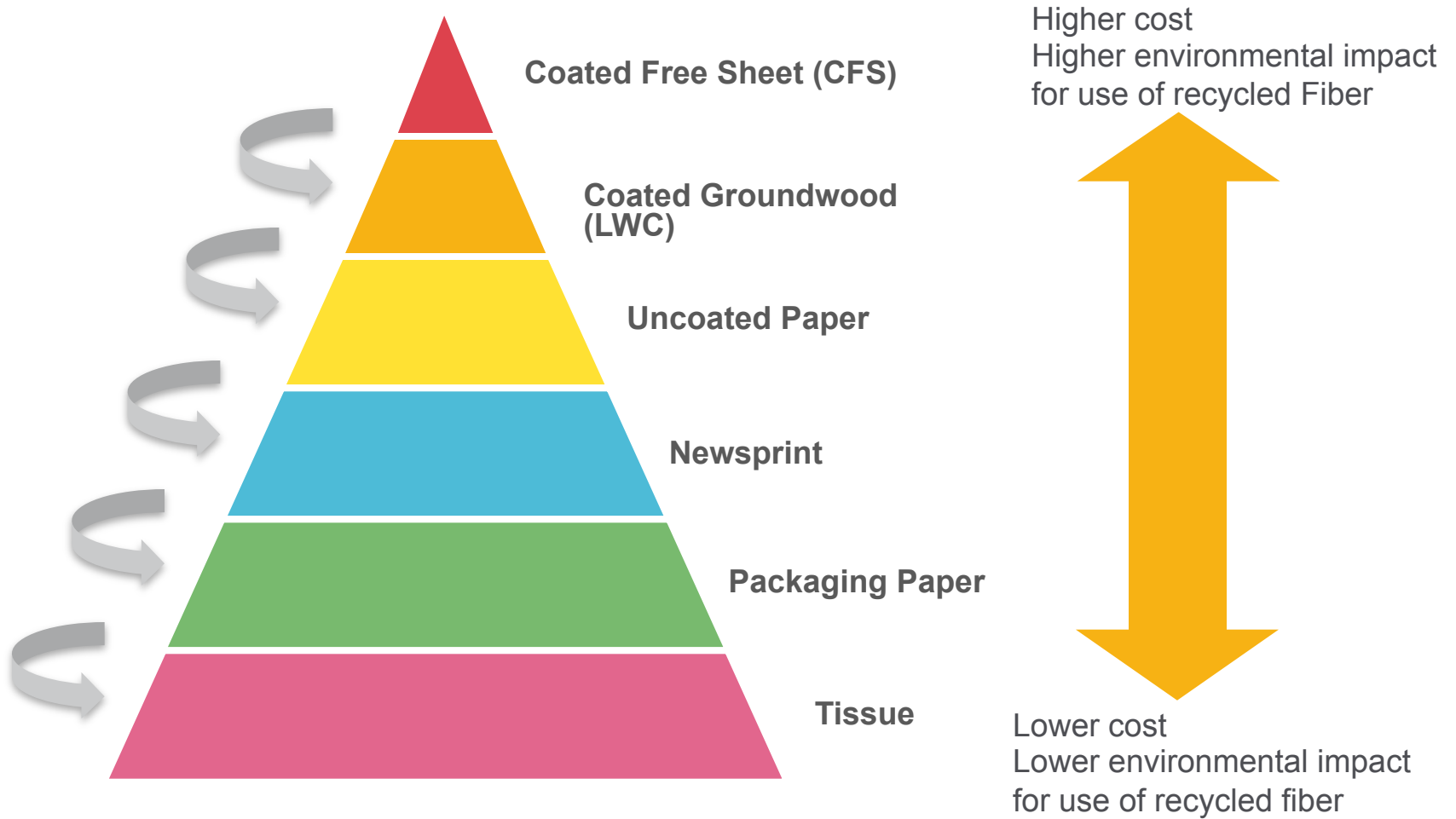


FSC, CSA, SFI, PEFC are all good programs for certification

- In 2006 only 8% of the worlds forests were certified by any system.
- **The real issue is to expand third party certification to the 92% uncertified– ultimately to promote and ensure sustainability.**
- It is not constructive to debate one system vs. the other but instead to pursue more certification on more acres-- no matter which system. All systems do this similarly and effectively world studies have shown.



Quality Pyramid for Paper





sappi

A Few Sources

- sappi.com
- fscscanada.org
- sfiprogram.org
- forestethics.org
- rainforestalliance.org
- green-e.org
- metafore.org
- environmentaldefense.org
- papercalculator.org
- sappi.com/ideasthatmatter (North America)
- sustainability.aiga.org

Class Field Trip

Candid Litho Printing

25-11 49th/Hunters Point Ave,

Long Island City, New York 11101

53-25 11th Street, Long Island City, New York

We will meet in the lobby of Candid Litho and start the tour no later than 3:15 on October 27th. The tour will end around 4:30/4:45 allowing you time to return to City Tech.

Candid Litho phone 212.431.3800 ask for Seth Pike

My cell number is 917.597.1891

Mid-Term Examination Protocol

Select any three or more topics and develop a 2-page minimum (4 pages is better) 12 point type, single spaced essay that links the selected topics to our class discussions.

**Color CMYK RGB Light Digital Printing
Offset Printing Web Printing Letterpress printing
PDF Pre-flighting Paper
The History of Printing Prepress/PreMedia
Proofing Workflow**

**Final paper is due emailed to me NO Later then October 20th –
PRIOR to our class. Email: tkubis@citytech.cuny.edu**

Homework Assignment

Read and be ready to discuss pages 114 to 134 and be ready to discuss the reading at our next meeting, October 13th, 2016.

Prof. Kubis

917.597.1891

TKubis@CityTech.Cuny.Edu