Paper & Print Academy

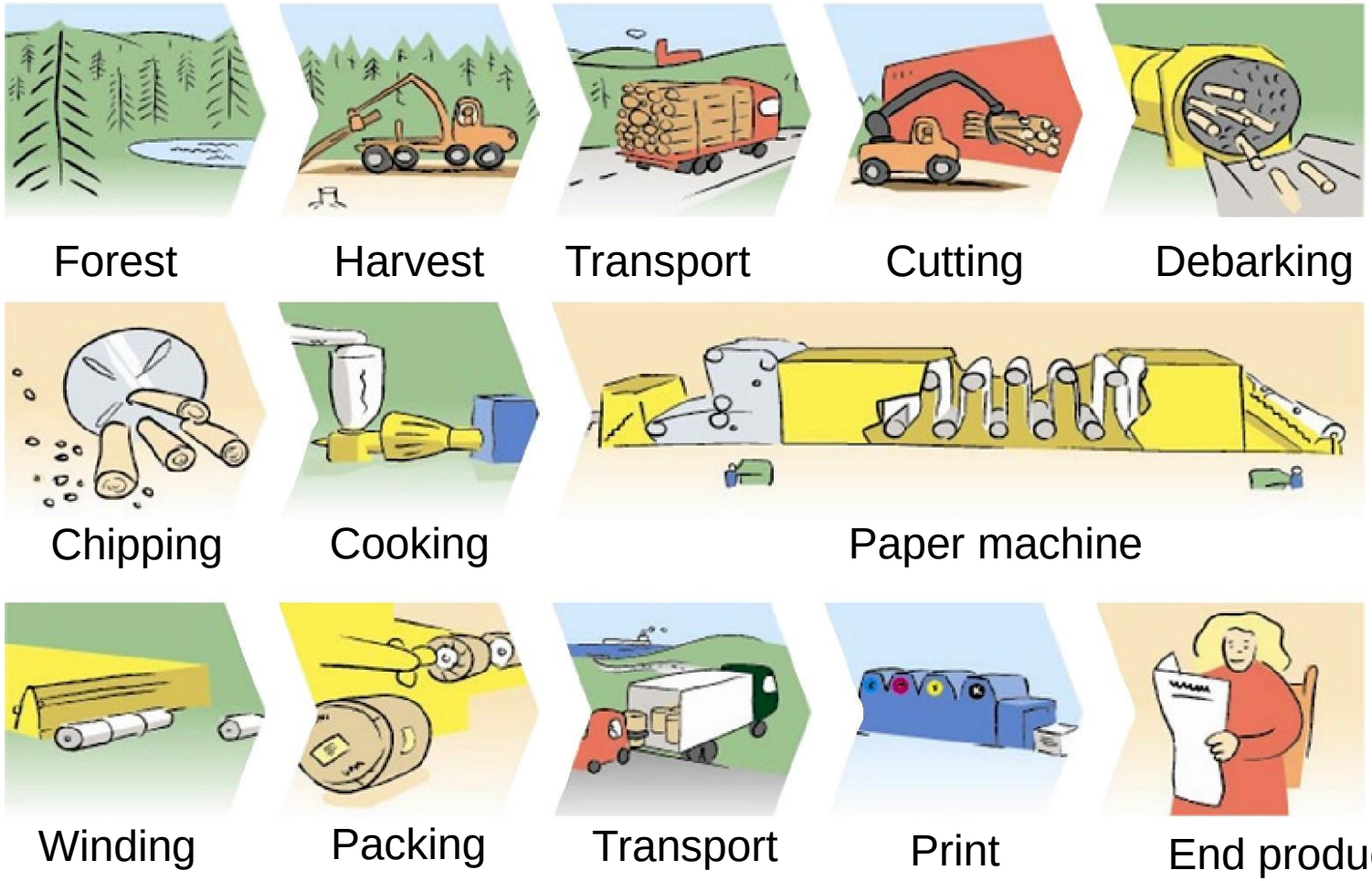
THE RENEWABLE MATERIALS COMPANY

Modules

1) Paper & Print Academy Overview
2) Sustainability and Traceability
3) **Raw Materials and Papermaking**
4) Relevance of Paper Properties for printing, converting & end-uses
5) Paper classifications
6) Prepress & Paper
7) Printing methods
8) Paper & Print Interaction
9) Paper Handling

03a Raw Materials

From raw material to final product



Industry value chain and key products

Pulp production

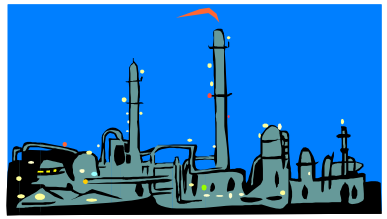
Paper, board and tissue production

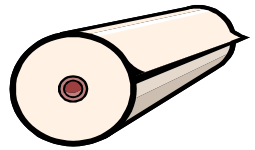
Converting

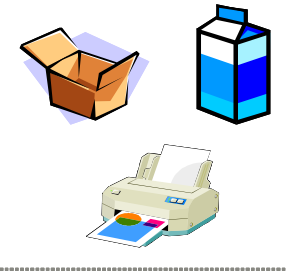
End users:

- printers
- offices
- industry
- households

Pulpwood







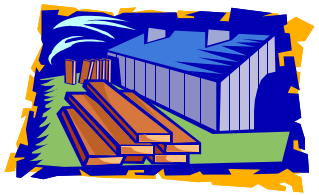
Recycling of waste paper

Chips

Timber

Saw logs

Value added

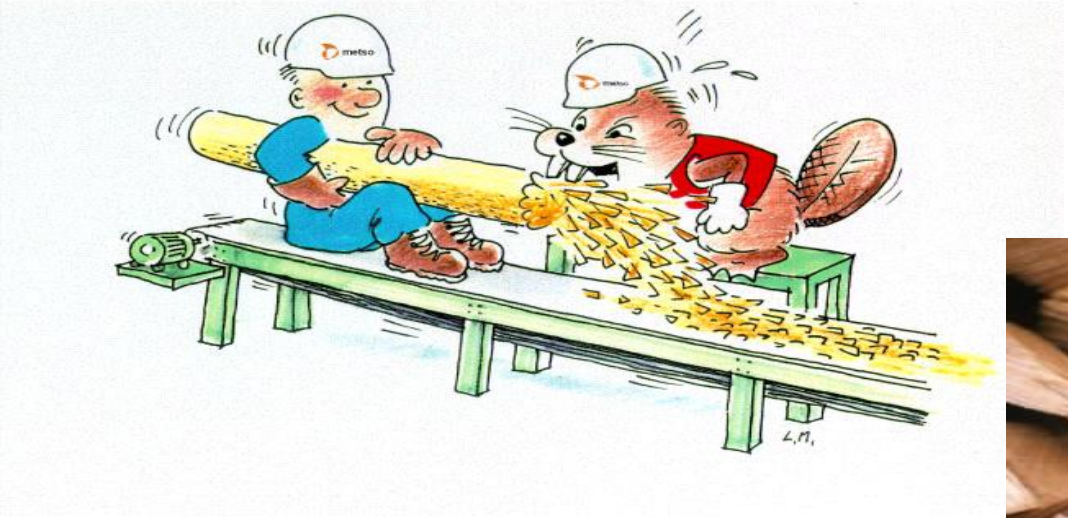


End users:

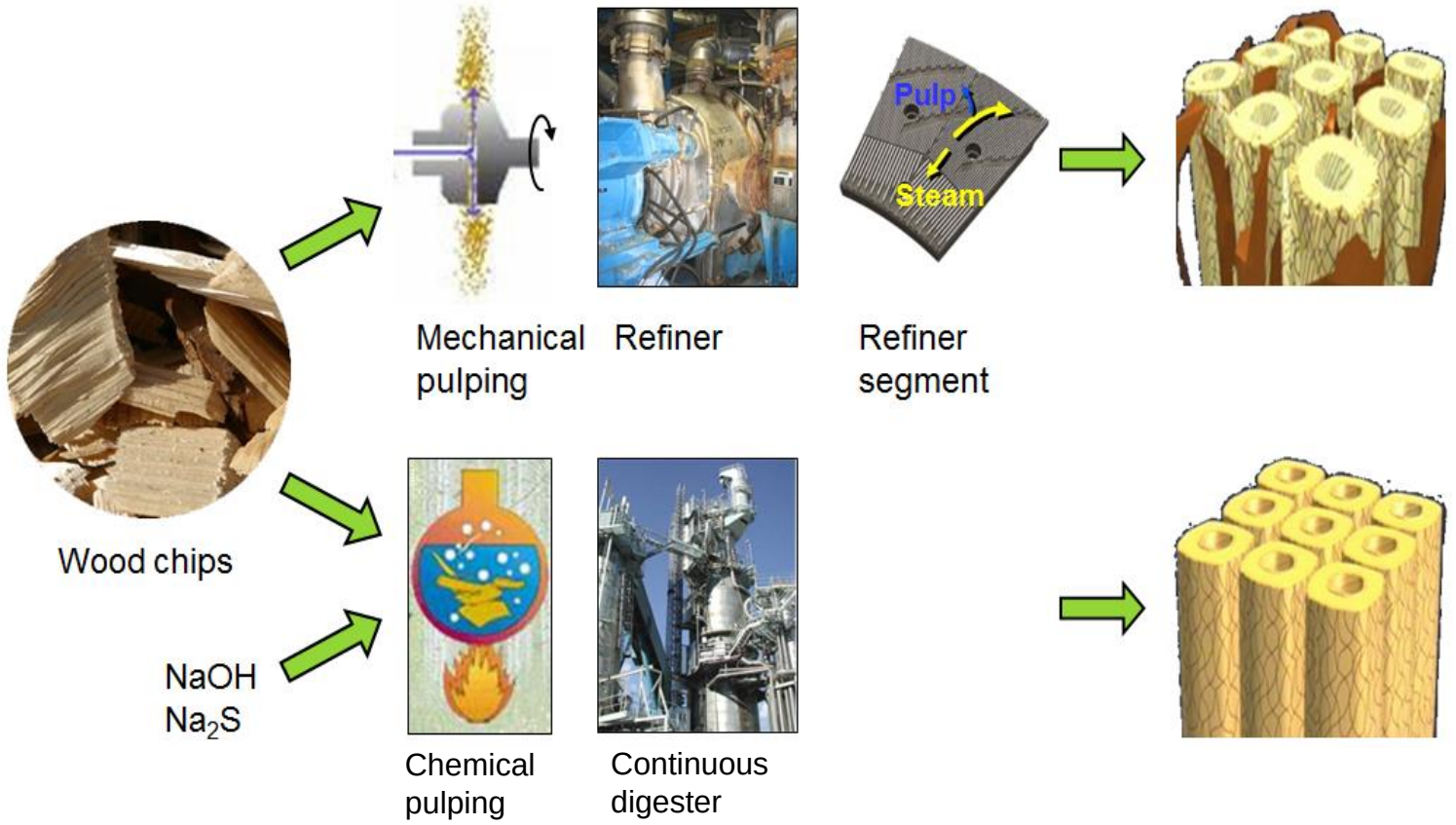
- construction / house building industry
- furniture industry

Debarking

Chipping



Mechanical and chemical pulp

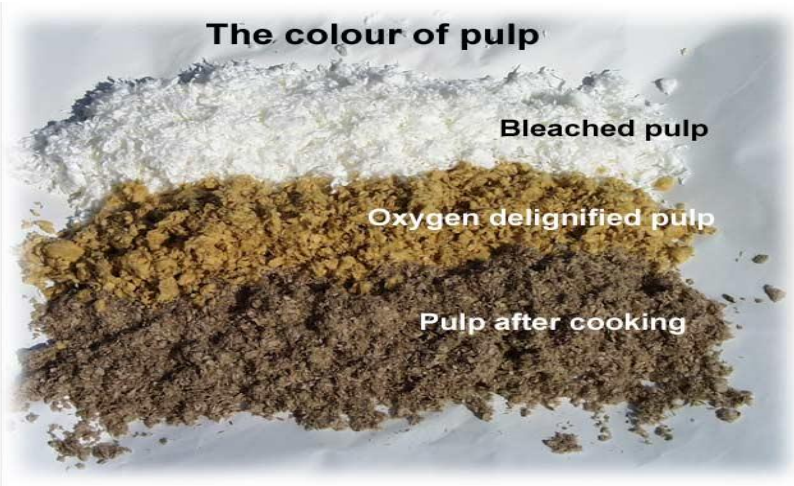


Impact on paper properties:
Strength
Porosity
Compressibility
Stiffness

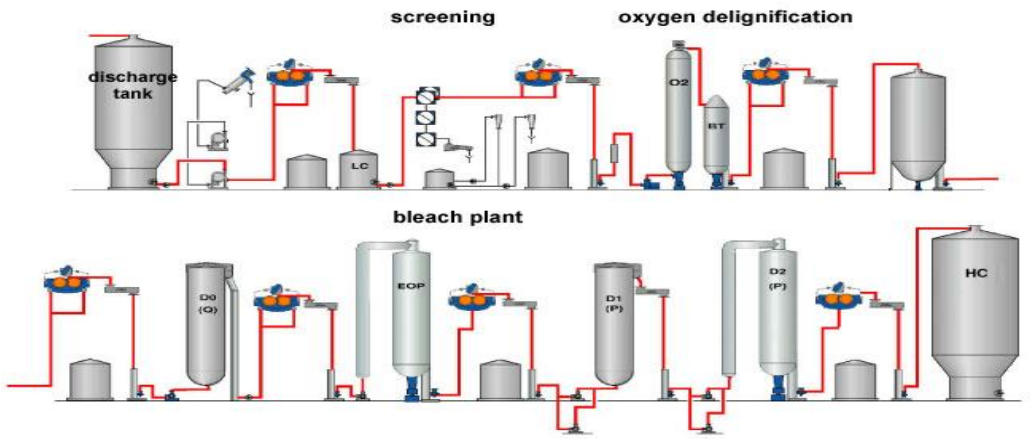
Bleaching
– ECF vs. TCF

- **ECF** (elemental chlorine free) = bleaching without chlorine *gas* Cl_2, chlorine dioxide ClO_2 is used

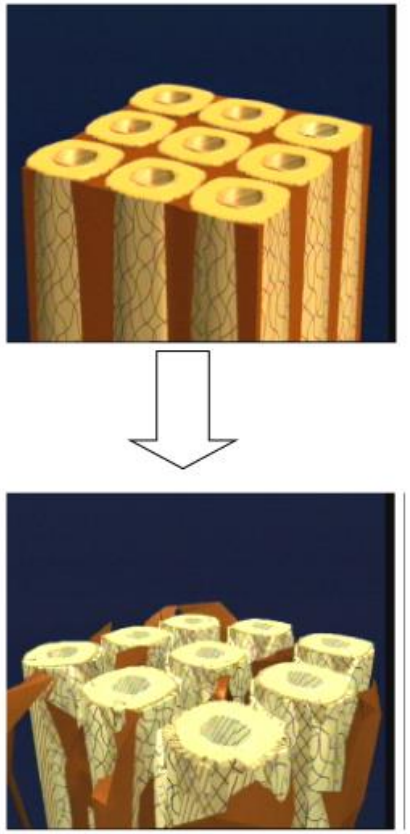
- **TCF** (total chlorine free) = bleaching without any chlorine *chemicals*, oxygen based chemicals are used

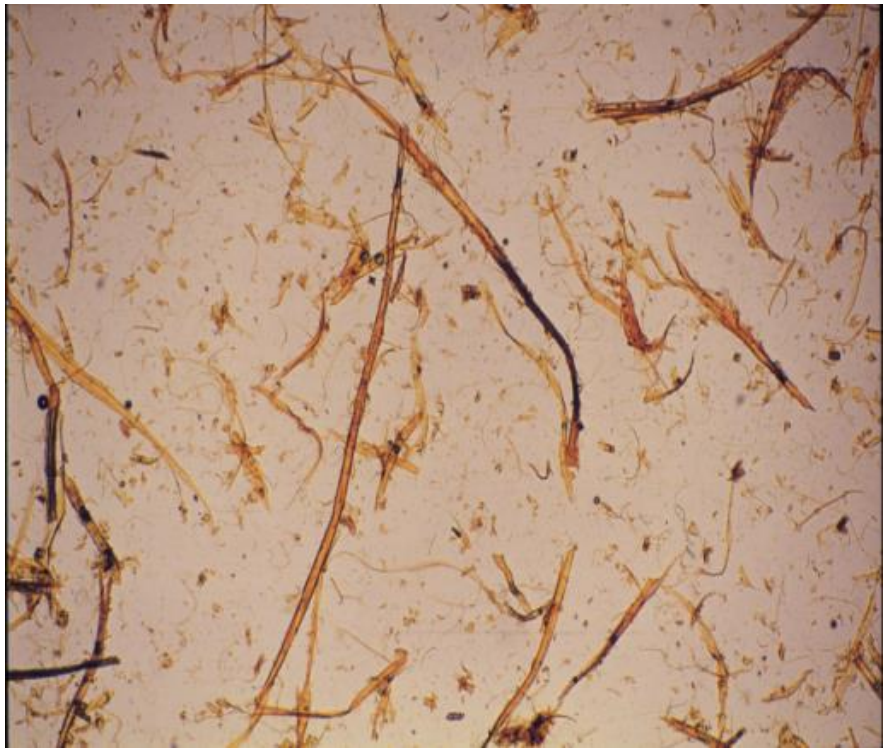


Example of a fiberline after the digester

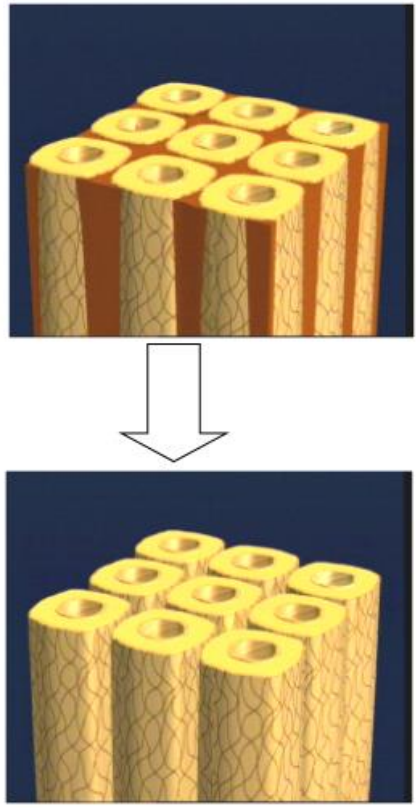


Separation of fibres for mechanical pulp





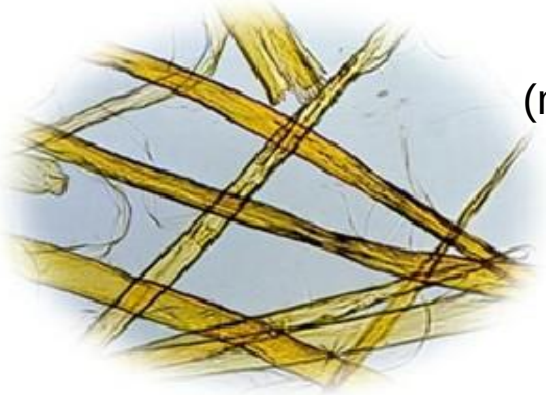
Separation of fibres for chemical pulp



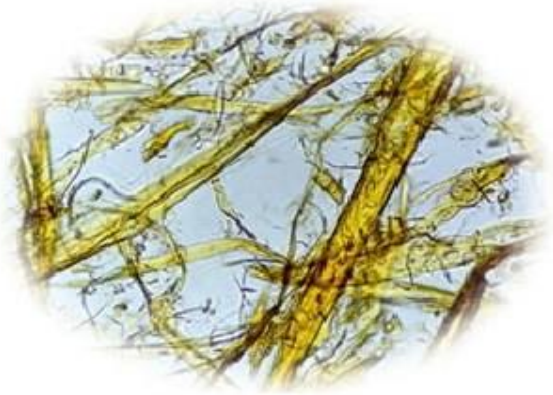
Recycling

https://www.youtube.com/watch?v=XI8DFDAClHw

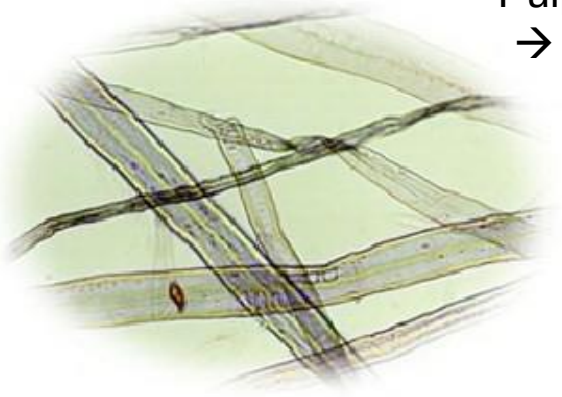
Main pulp qualities



TMP
(mechanical)



Groundwood
(mechanical)



Pulp (chemical)
→ ‚Woodfree‘

Recycled & Deinked
paper

Paper making chemicals

For paper properties…

- Pigments as fillers and as coating
  - Printing
  - Calcium carbonate (marble, PCC), clay
- Optical brightening agents
  - Whiteness
- Shading / colorants
  - Shade of paper
- Glues (starch etc.)
  - Surface strength
  - Controlled ink absorption

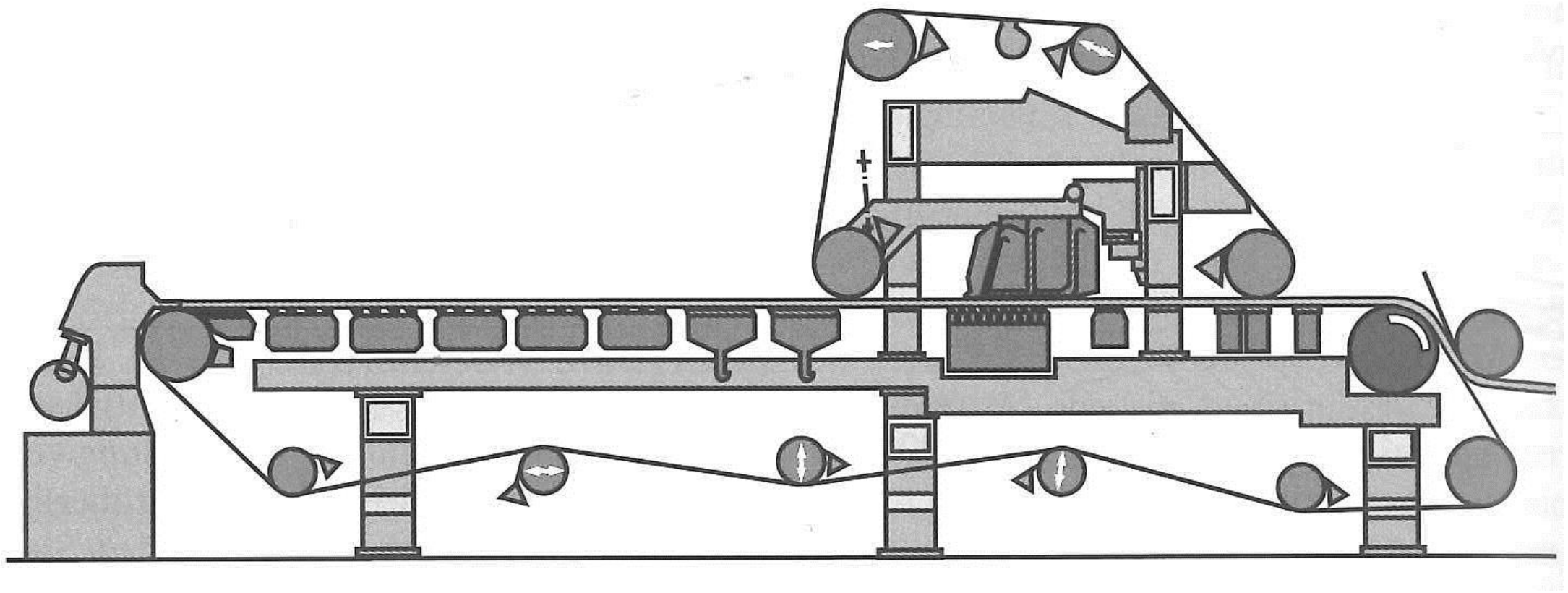
For functionality on paper machine…

- Retention aids
- Defoamers
- Biocides - slime prevention
- Binders – for fixing coating pigments

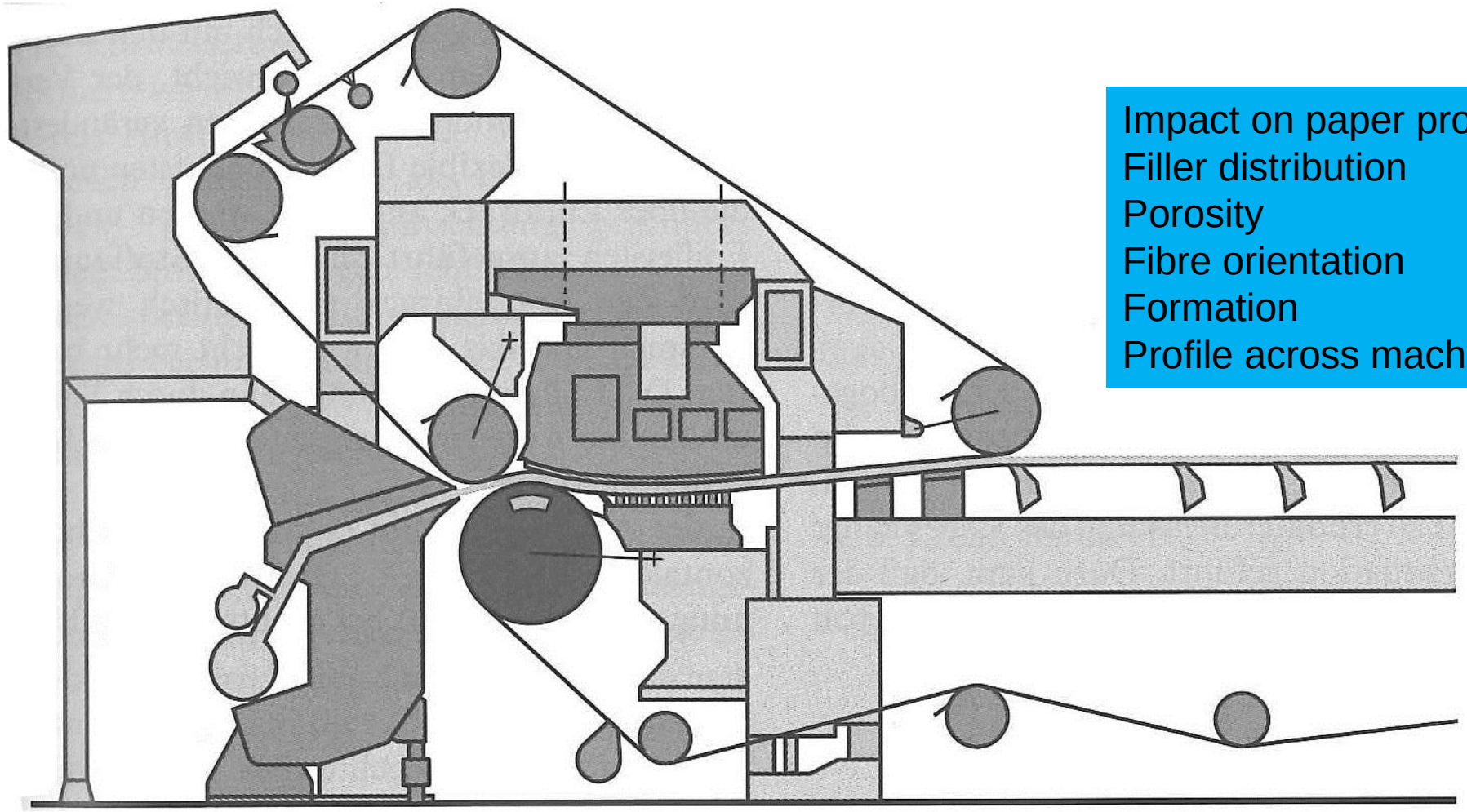
03b Paper Making

Paper Machine

Hybridformer

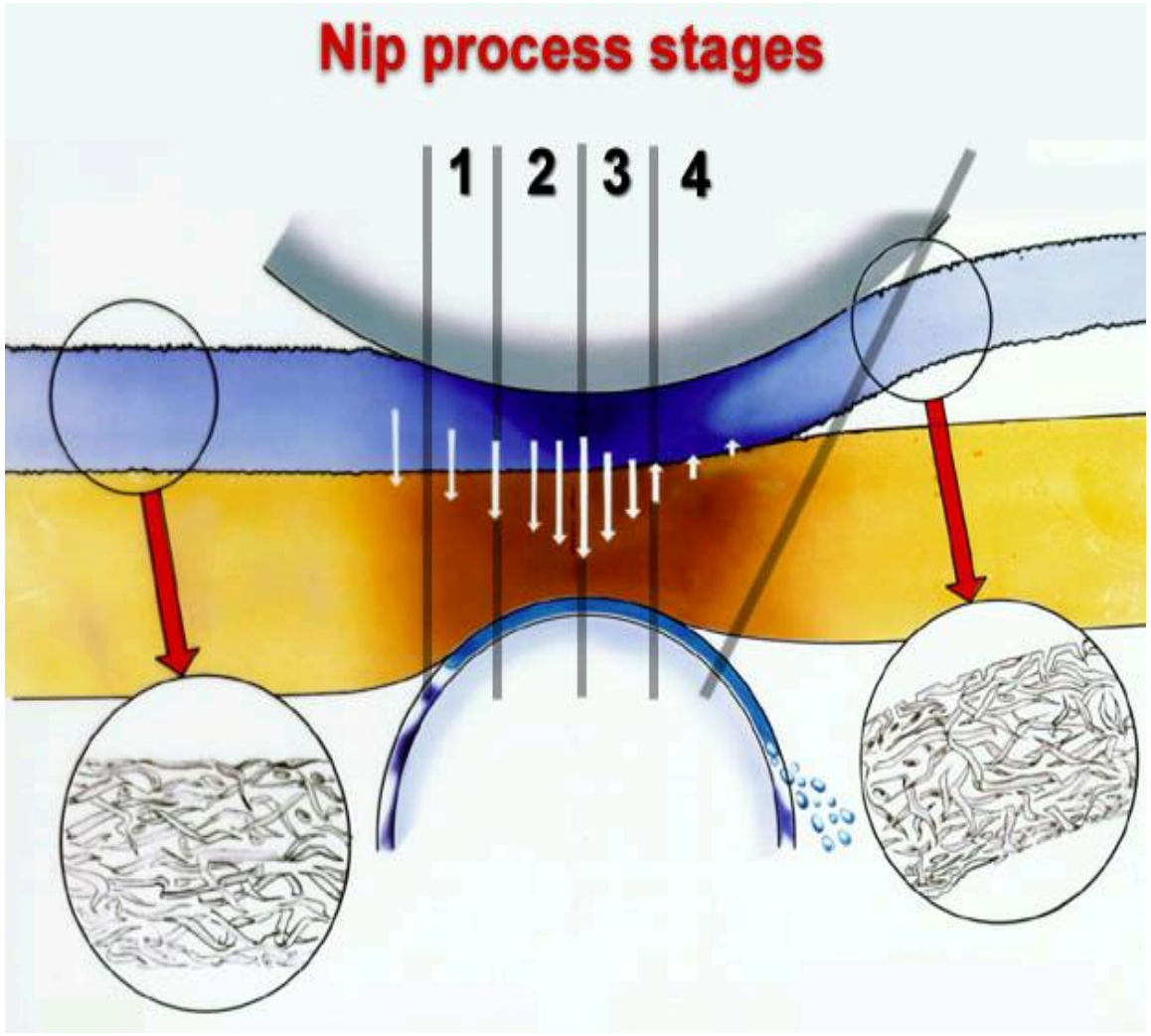


Gapformer



Impact on paper properties:
Filler distribution
Porosity
Fibre orientation
Formation
Profile across machine width

Press Section

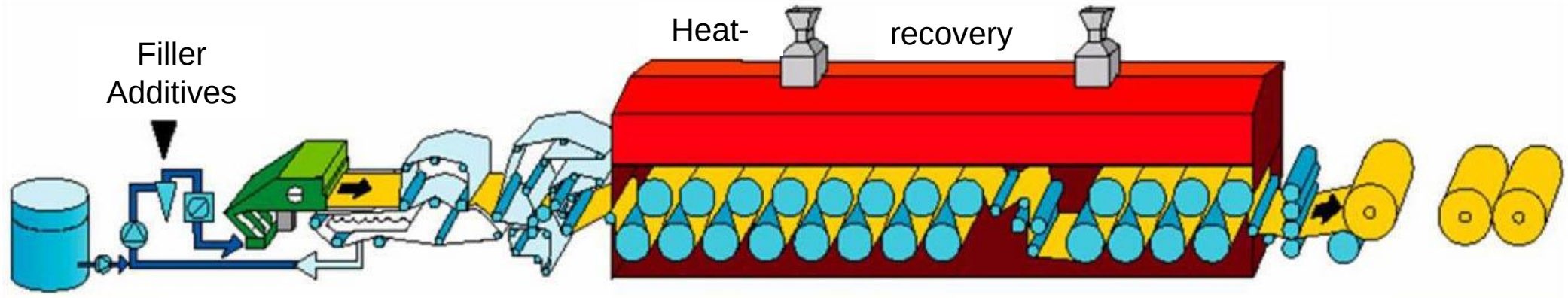


Impact on paper properties:
Thickness
Surface structure

Drying section

Water removal through the paper making process

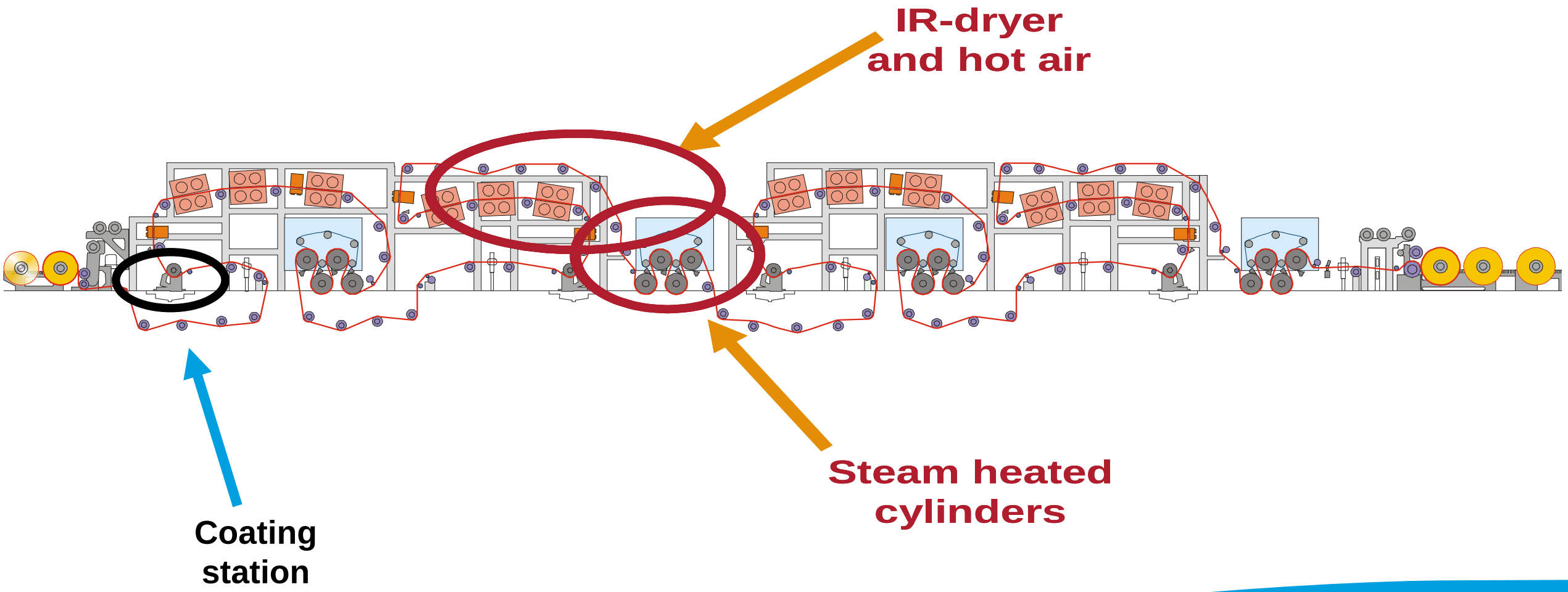
Pulp (1%)



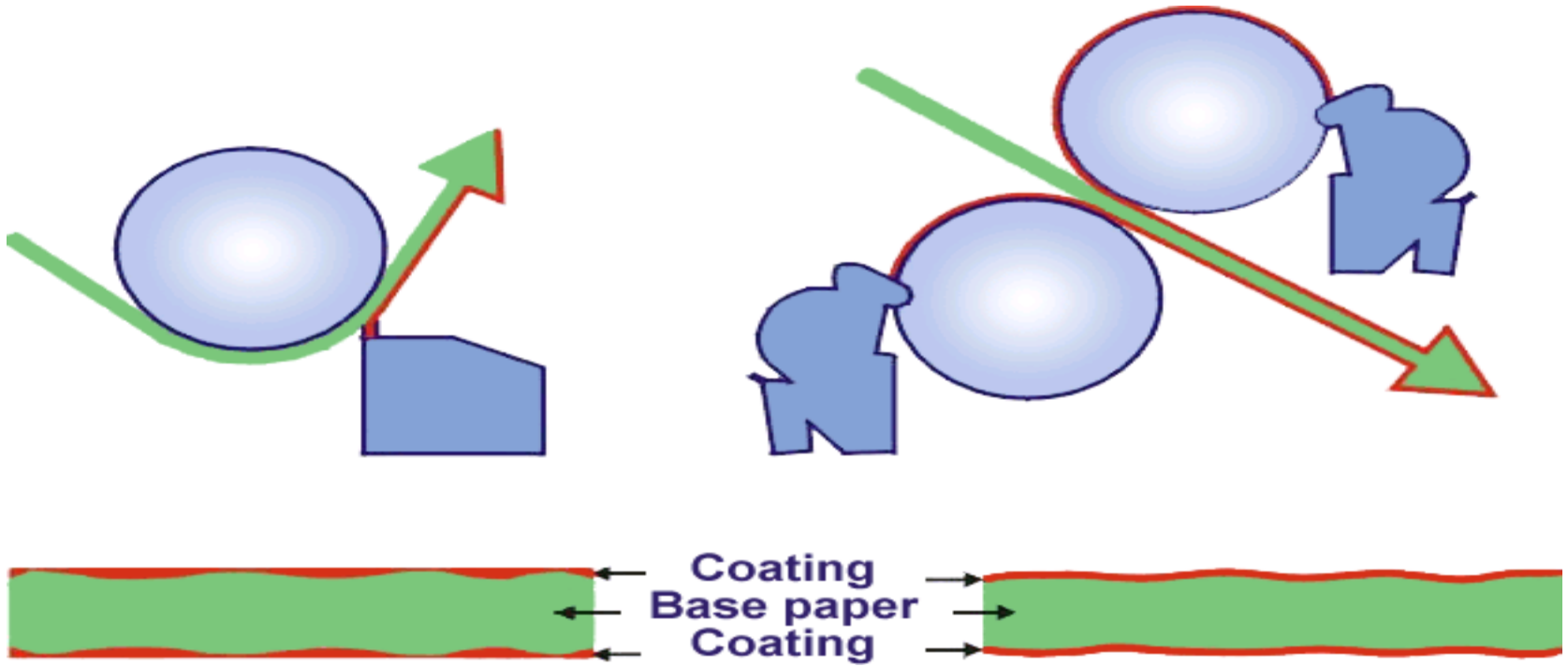
Headbox	Wire	Press section	Dryer	Coating/Sizing	Dryer	Calander	Tambour
0,5-1%	20%	50%	95%	80%	90%	95%	95%

Tambour or mother reel after paper machine

Double Coating (Off-Line)



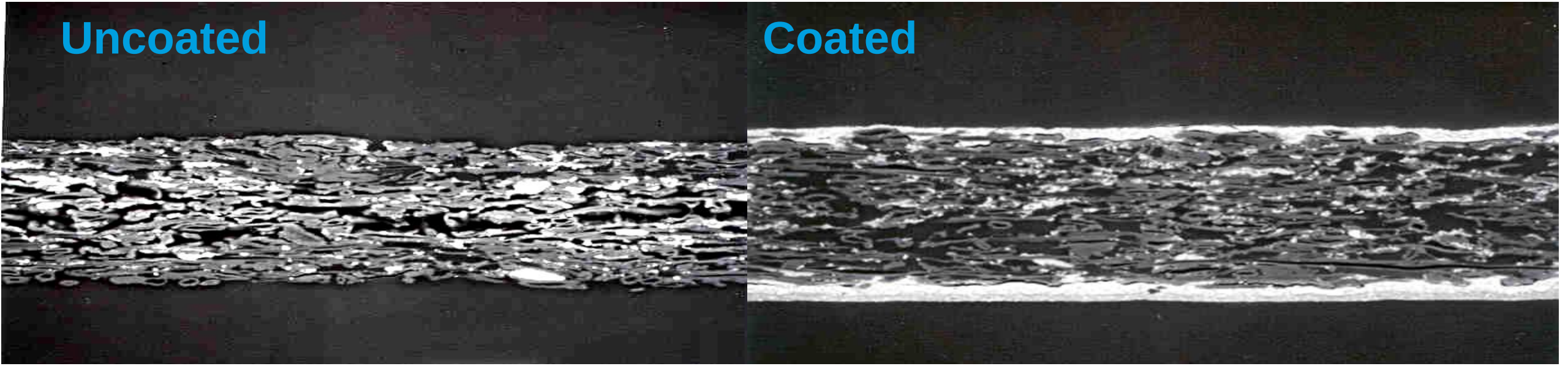
Film and blade coating

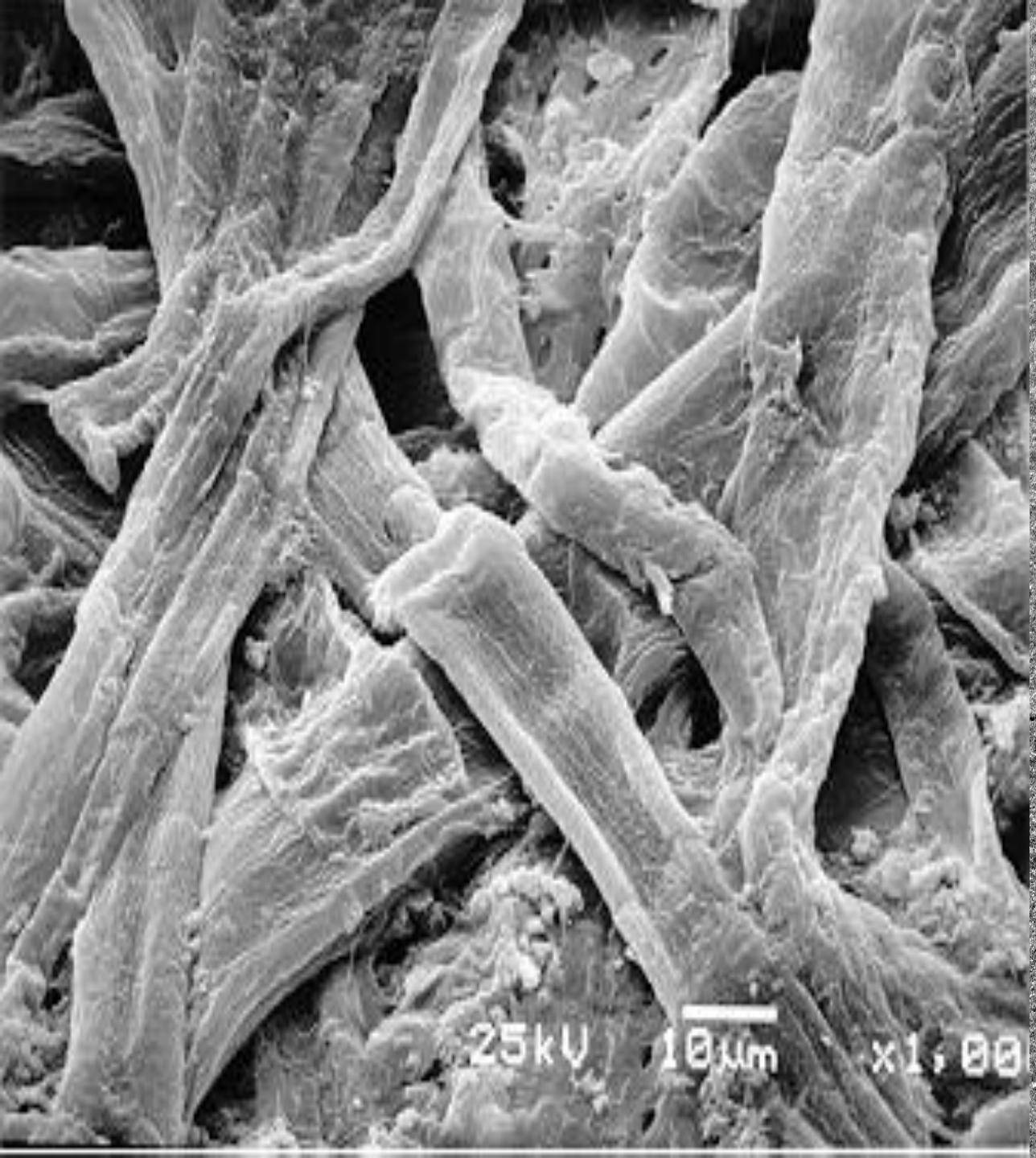


Impact on paper properties:
Smoothness
Gloss
Bulk

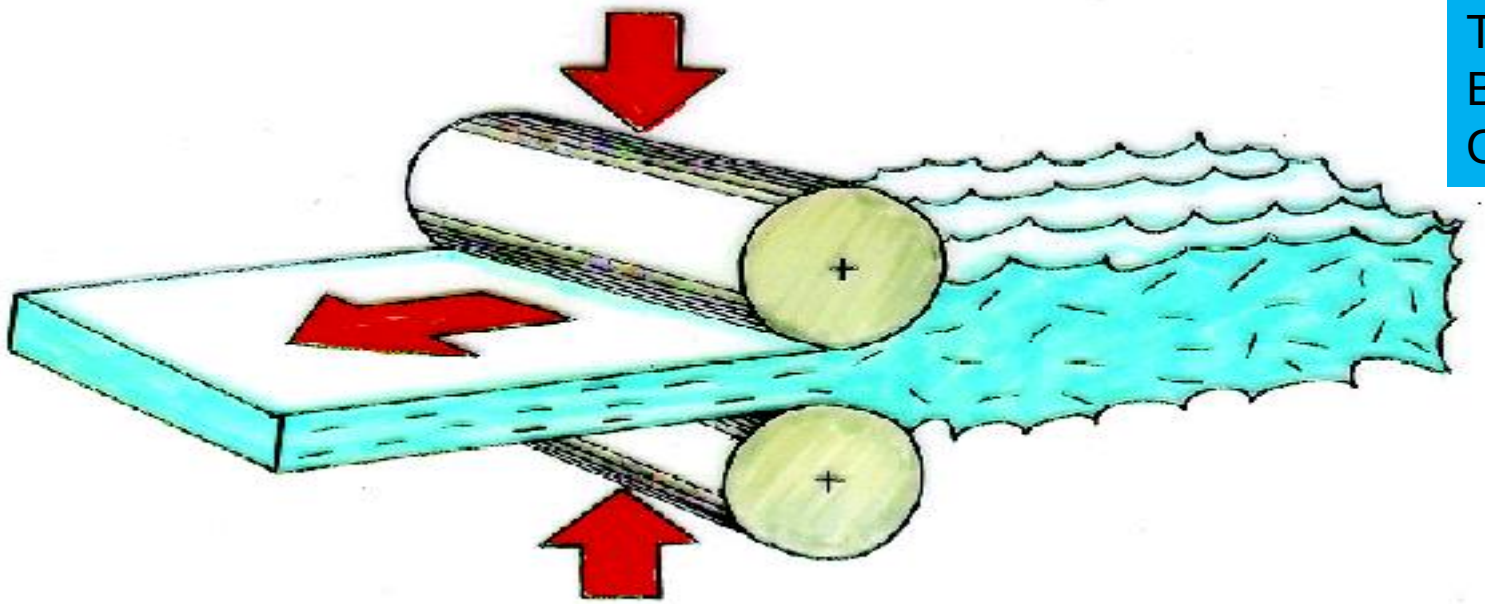
Coating unit

Difference in surface between uncoated and coated



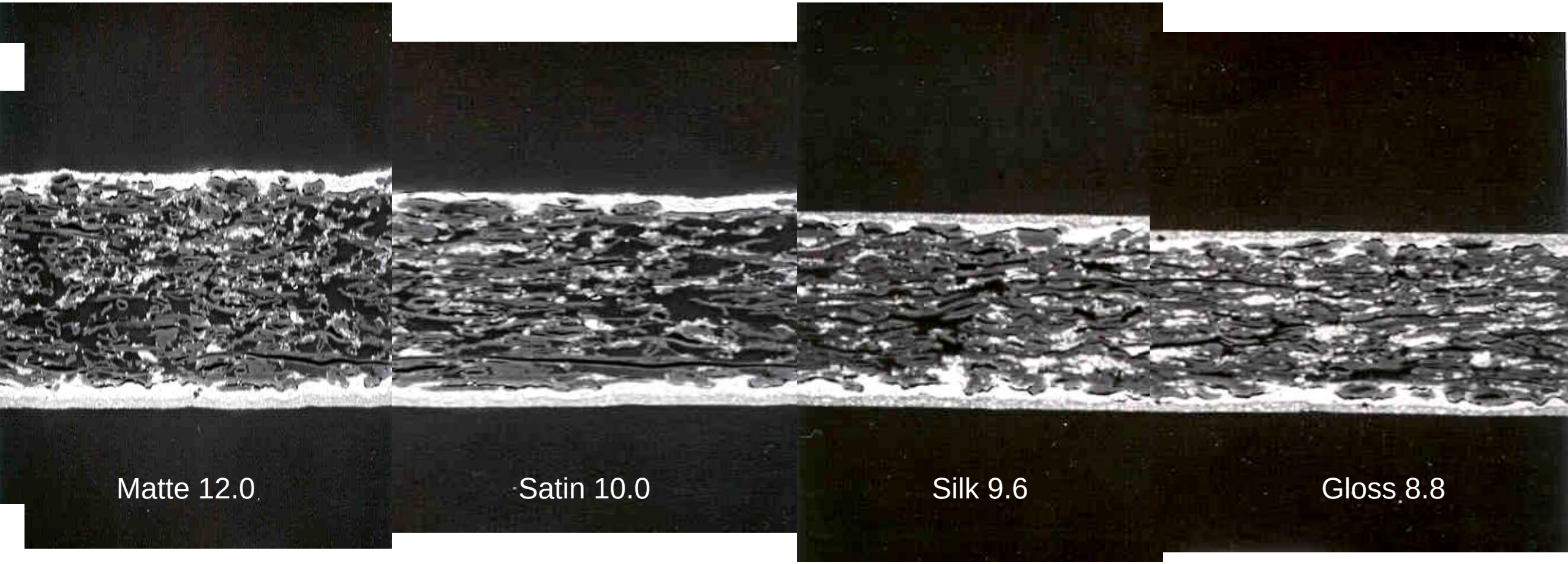

25kV
10µm
x1,00

Calendering



Impact on paper properties
Gloss
Smoothness
Thickness
Blackening
Opacity

Effects of Supercalendering



Thank you!