



# *Stora Enso*

## *Fine Paper Varkaus Mill*



# Varkaus – in the middle of the lake district



# Paper industry cluster in Varkaus



## Varkaus Mills



## Stora Enso Fine Paper

Integrated sulphate pulp mill

- ECF 225 000 t/a

One paper machine

- Envelope paper, Business Forms (Preprint) & Offset paper
- Production 315 000 t/a (2009)
- Main raw materials bleached pine and birch pulp
- 98 % exported
- Main markets: EU



## Wood Handling Plant



## Wood Handling Plant

- Start-up September 2007
- Investment of 46,7 M€
- Supplying fibre raw material both to Fine paper and Publication paper mills
- Production capacity 2,1 million solid meter (sob)
- Modern two-line wood handling
  - improved quality of chips
  - better yield in pulping
  - better bleachability
  - higher pulp strength
  - decreased energy consumption
  - less environmental loading



## Wood Handling Plant

- Main technical scope
  - Power feed conveyor / deicing
  - Debarking drum
  - Horizontally fed chipper
  - Thickness screen
  - Oversize chips cutter



## Technical Scope of Varkaus PM3

### Asset development

- Investment 54,8 M€
- Production increase + 95 000 t/a
- Capacity 315 000 t/a

### Technical main scope

- Former and press-section rebuild
- New winder and rewinder
- Fully automatic reel handling

### Timing

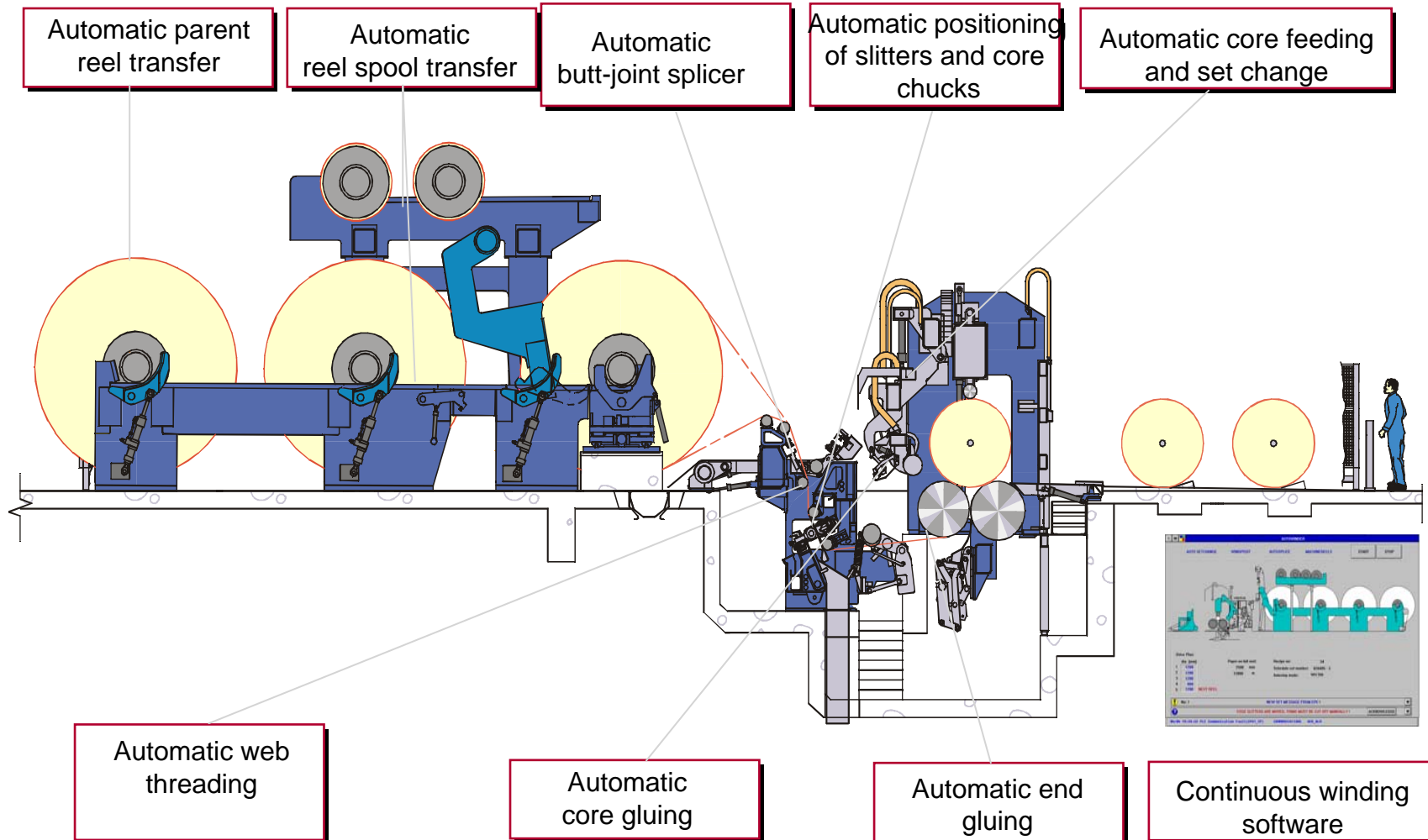
- Offset paper reels, LumiSet, started in December 2007
- Berga Classic Preprint production started in January 2008
- Berga Mail+ production started in February 2008



## Rebuilt of PM3 – Main Changes

Where?	What's new?	Improves...
Wire section	Modernized wire section with new dewatering elements and vacuum shoe technology	Paper formation
Press section	Shoe press in third nip for higher dryness	Paper machine runnability
Drying section	Ropeless tail threading, new blow boxes and new guiding and stretcher rolls	Paper machine runnability, total efficiency
Sizing and after drying	Profiling infrared equipment	Moisture profile
Finishing	New cutter and rewinder	Quality of customer reels

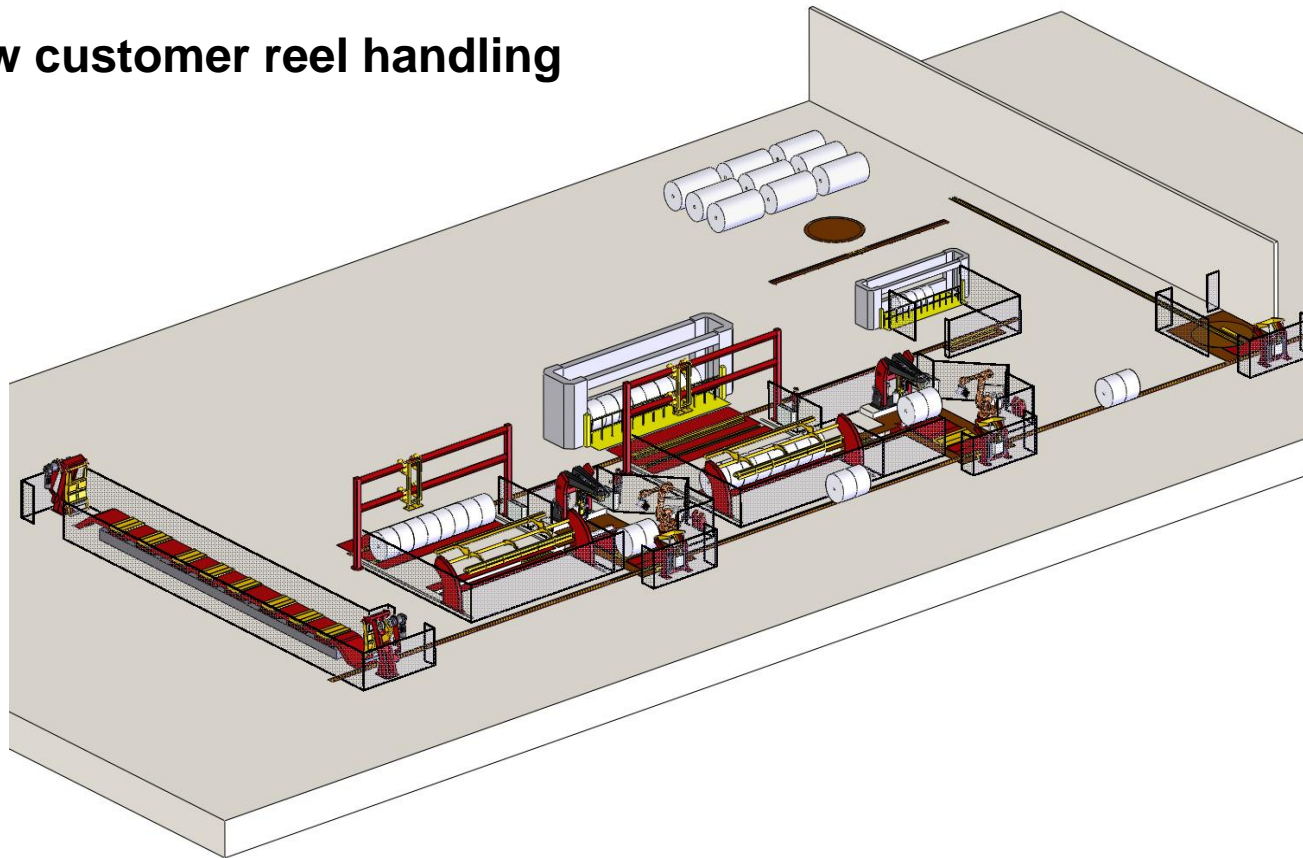
# Automatic functions of PM3



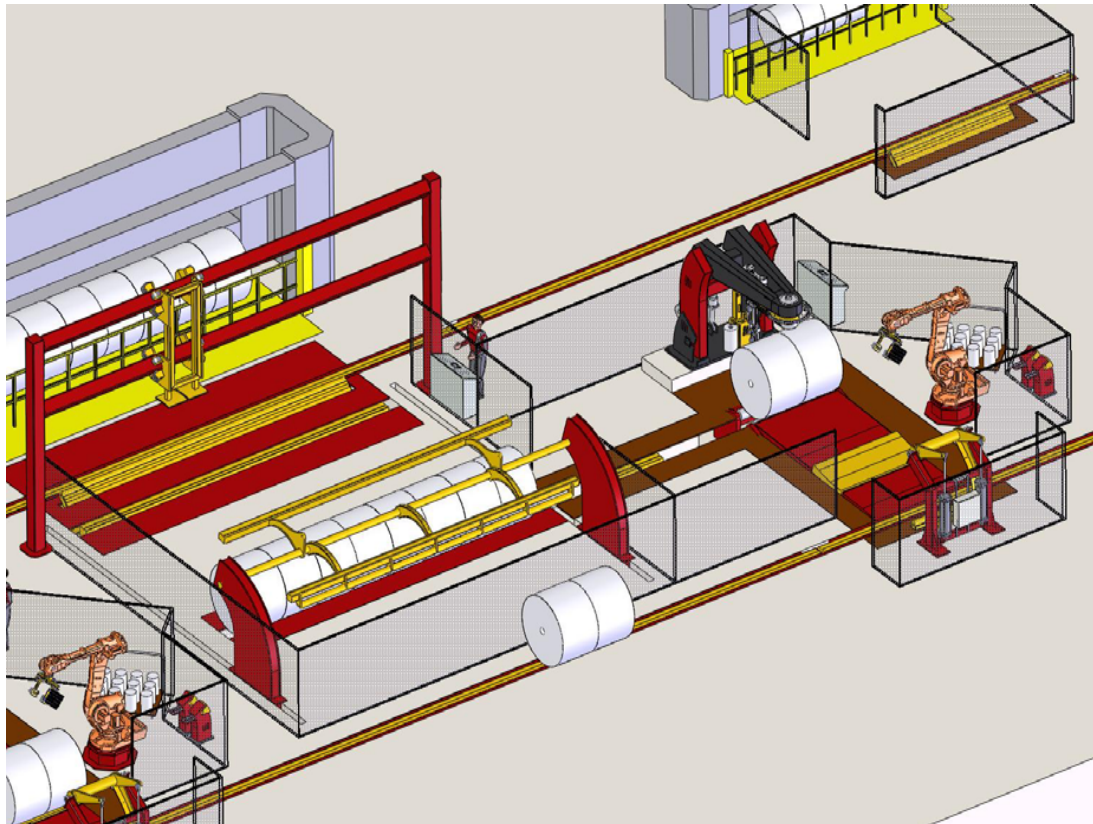
## Winding and Rewinding – Main Changes

**New cutter and rewinder**

**New customer reel handling**



## Winding and Rewinding – Main Changes



- State-of-the-art winding technology
- Web separating device  
→ no married reels
- Tail gluing and ink jet marking of customer reels
- Light plastic band of multi reel packages (no inner cores needed)

## Benefits for our customers

### *Envelope paper, Berga Mail +*

- Main product of Varkaus PM3
- Less capacity restraints
- More efficient slitting/rewinding – no bottle-neck
- Improved whiteness, from 160 CIE to 163 CIE
- Possibility to label every single reel, not just the package
- Preprint and envelope papers with the same shade – better house styling possibilities



## Products and benefits

Product	Benefits	Reel	Sheet	Standard range g/m <sup>2</sup>
Berga Superior	<ul style="list-style-type: none"><li>• Paper for the highest quality envelopes</li><li>• Provides the best printing results with the highest efficiency</li><li>• Very high whiteness giving superior appearance</li><li>• High opacity and excellent formation ensuring low print-through</li></ul>	●	●	80, 90, 100, 120
Berga Mail+	<ul style="list-style-type: none"><li>• Europe's most popular envelope paper</li><li>• High whiteness</li><li>• Low print-through</li><li>• Excellent runability in all envelope and inserting machines</li></ul>	●		70, 75, 80, 90, 100, 120
MultiMail	<ul style="list-style-type: none"><li>• Scandinavia's first choice</li><li>• Smooth surface and high whiteness</li><li>• High bulk and stiffness</li><li>• Totally chlorine free</li></ul>	●	●	80, 90, 100

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## Benefits for our customers

### *Preprint, Berga Classic Preprint*

- Full needed range of reel widths
- Improved formation
- Possibility to grow
- Preprint and envelope papers with the same shade – better house styling possibilities



## Products and benefits

Product	Benefits	Conversion	Laser	Inkjet	Range g/m <sup>2</sup>
Berga Superior Preprint	<ul style="list-style-type: none"> <li>• Top quality preprint paper with high whiteness for high image forms</li> <li>• Top performace with full colour applications</li> </ul>	Reel to A4 Reel-to-reel Reel-to-fanfold	●	●	80-120
Berga Classic Preprint	<ul style="list-style-type: none"> <li>• Good multifunctional preprint paper</li> <li>• Good runnability in converting, laser, inkjet and plotters</li> <li>• Good printability with ¾ colours</li> </ul>	Reel to A4 Reel-to-reel Reel-to-fanfold	●	●	70-115
Multiform Preprint	<ul style="list-style-type: none"> <li>• Good TCF multifunctional preprint paper</li> <li>• Good runnability in high speed lasers</li> <li>• Good printability wiht ¾ colours</li> </ul>	Reel to A4 Reel-to-reel Reel-to-fanfold	●	●	70-100

## Products and benefits

Product	Benefits	Conversion	Laser	Inkjet	Range g/m <sup>2</sup>
Berga Form Laser	<ul style="list-style-type: none"> <li>• Laser guaranteed constant paper with excellent runnability in high speed laser production</li> <li>• Consistent quality ensuring precise perforations and folds</li> </ul>	Reel-to-reel Reel-to-fanfold	●		70-90
Berga Form*)	<ul style="list-style-type: none"> <li>• Economic listing paper with excellent runnability</li> <li>• Consistent quality ensuring precise perforations and folds</li> </ul>	Reel-to-fanfold			60

\*) Limited availability

## Berga Mail+ Reel Specifications

Basis weight	Standard: 75, 80, 90, 100 and 120 Special: 70, 85, 95 and 110 gsm
Trim width	765 cm for 70 gsm 768 cm for 75 gsm and up
Reel diameter	120 cm, 140 cm and 150 cm
Reel width	Min 156 mm, max 2600 mm Only even millimeters in reel widths accepted
Reel weight	Max 3000 kg
Core	151 mm
Packing	156 – 178 mm 5 reels/package 180 – 228 mm 4 reels/package 230 – 308 mm 3 reels/package 310 – 514 mm 2 reels/package 516 mm and over 1 reel/package
Other	Plastic band for multiple reels + kraft wrapper Inkjet marking on each reel belly + multiple id-cards Number of splices marked on the reel label



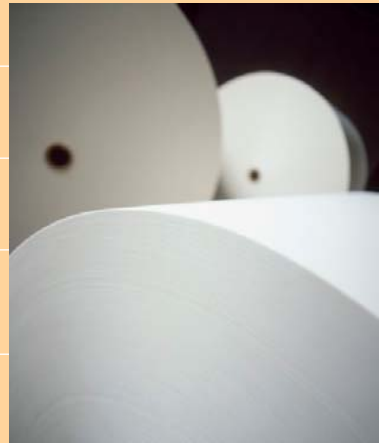
## Berga Classic Preprint Reel Specifications

Basis weight	70, 75, 80, 90, 100 and 115 gsm
Trim width	765 cm for 70 gsm 768 cm for 75 gsm and up
Reel diameter	100 cm (only for Europe) and 120 cm
Reel width	Min 210 mm, max 2600 mm
Reel weight	Max 3000 kg
Core	70 and 76 mm 151 mm only with diameter 120 cm
Packing	210 – 255 mm 4 reels/package 256 – 345 mm 3 reels/package 346 – 500 mm 2 reels/package 501 mm and over 1 reel/package
Other	Plastic band for multiple reels + kraft wrapper Inkjet marking on each reel belly + multiple id-cards Number of splices marked on the reel label



## LumiSet Premium Reel Specifications

Basis weight	70, 80, 90 and 100 gsm
Trim width	765 cm for 70 gsm 768 cm for 80 gsm and up
Reel diameter	100 cm (only for Europe) and 120 cm
Reel width	Min 420 mm, max 2600 mm
Reel weight	Max 3000 kg
Core	70 and 76 mm
Packing	420 – 500 mm 2 reels/package 501 mm and over 1 reel/package
Other	Plastic band for multiple reels + kraft wrapper Inkjet marking on each reel belly + multiple id-cards Number of splices marked on the reel label



## Production cycles

### Envelope Papers (Berga Mail+)

- 80 and 90 gsm every week
- 75 and 85 gsm twice a month
- 70, 95 and 100 gsm once a month
- 110 and 120 gsm every second month

### Business Forms (Berga Classic Preprint)

- 80 gsm every week
- 90 gsm three times a month
- 70, 75 and 100 gsm once a month
- 115 gsm every second month



## Main Transport Methods



In Gothenburg the Finnish and Swedish cargo flows are combined for transshipment to Zeebrugge, Tilbury and Immingham.

Main European ports:

- Zeebrugge 55 Kton
- Tilbury & Immingham 40 Kton
- Lübeck 30 Kton
  
- 10 % of deliveries to customers by truck and 90 % by vessel
  
- 20 % of paper from mill to Finnish export ports by truck and 80 % by train

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## SECU is a huge "container" or "cassette with walls and roof"

	outside	inside
Length /m	13,800	13,575
Breadth/m	3,600	3,430
Height	4,375	3,430
Grossweight max		93 000 kg
Tara standard units		13 500 kg
automaticload		14 560 kg
Max payload in trains		68 100 kg
in port/ship		79 500 kg

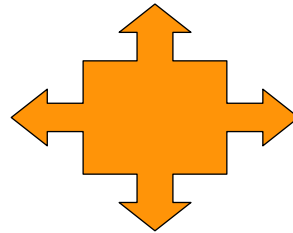


# Quality Control

**Customer feedback and quality benchmarking**

## Raw material control

- Wood raw material (inc. traceability)
- Pulp
- Fillers
- Additives
- Regular audits with main suppliers



## Paper measurements after paper machine

- Paper tests important from end use point of view
- Visual check of full paper web
- Laboratory scale printing tests
- Print through mottle measurements

## On-line paper machine control

- Measurements in machine and cross machine direction by continuous scanning of paper web
  - grammage, caliper, moisture content profile, filler content, optical properties, air permeability, formation
- Control of fiber orientation
- Paper web fault detector for holes, spots, impurities
- Visual check of full paper web

## Certificates

- **Environmental**
  - ISO 14001
  - EMAS
  - Nordic Swan Label
  - PEFC: CoC (Chain of Custody)
  - FSC: CoC (Chain of Custody)
  - PEFC labelled paper from April 2008 onwards
- **Quality**
  - ISO 9001



## Latest Investments

- Modernization of PM3 headbox and installation of new soft calander 2005
- Rebuild of wood handling plant 2007
- Rebuild of PM3 former and press-section, new winder and rewinder, fully automatic reel handling 2007

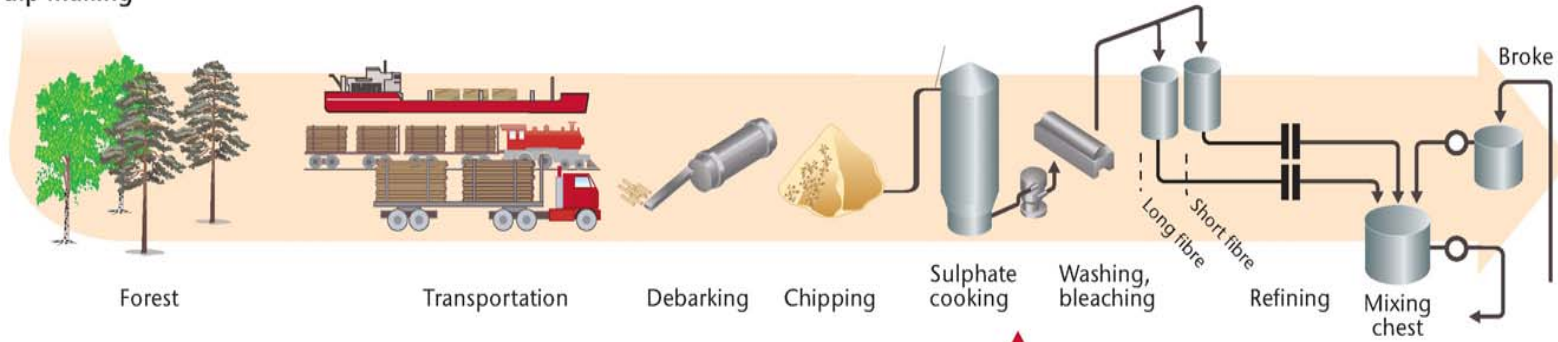




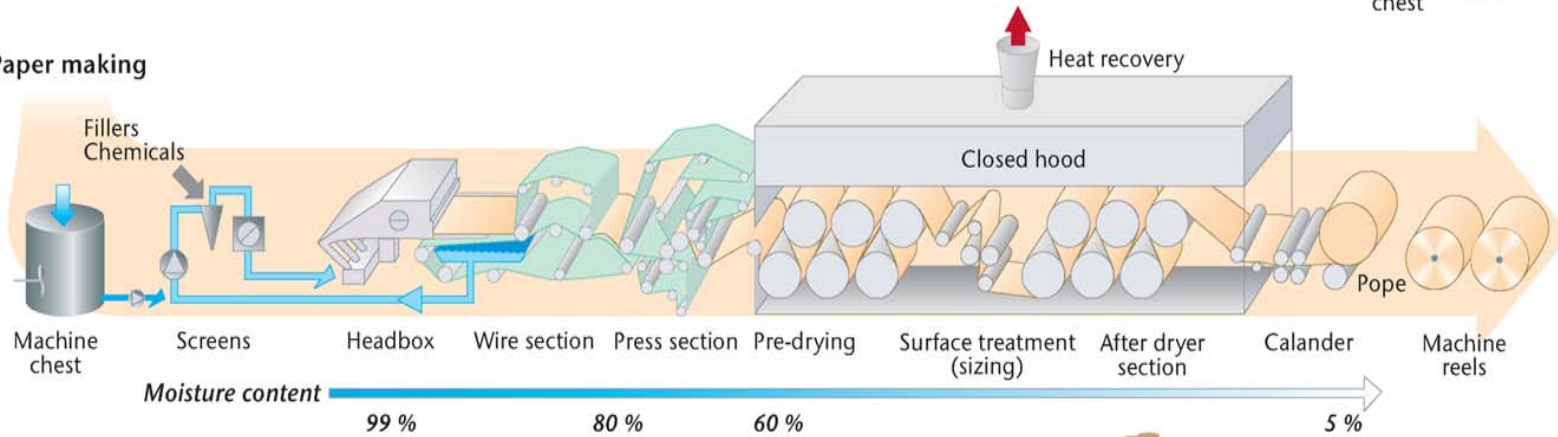
# *Appendix*



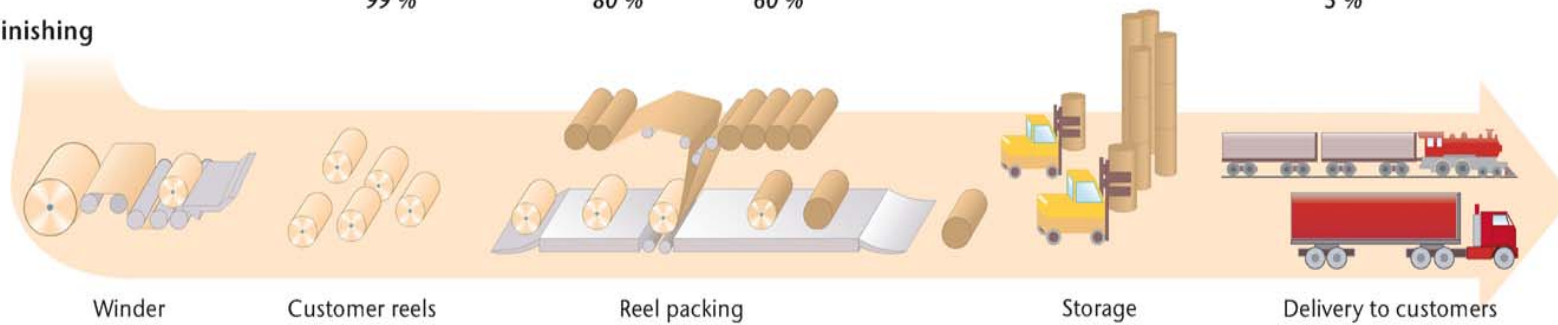
**Pulp making**



**Paper making**



**Finishing**



# Pulp Mill

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## Sulphate Pulp Mill

<b>Start:</b>	1980
<b>Cooking:</b>	Continuous cooking
<b>O<sub>2</sub>-stage:</b>	2-stage oxygen delignification
<b>Bleaching:</b>	D <sub>0</sub> -EOP-D <sub>1</sub>
<b>Total Capacity:</b>	225 000 tons
<b>Products:</b>	Bleached hardwood pulp (ECF), bleached softwood pulp (ECF), tall oil and turpentine
<b>Wood raw materials:</b>	Birch, pine and spruce



# Machines

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## PM 3

<b>Built:</b>	1961
<b>Rebuilt:</b>	1985, 1987, 1992, 2005, 2007
<b>Manufacturer:</b>	Voith/Valmet/Metso
<b>Type of machine:</b>	Twin-wire / film press
<b>Capacity:</b>	315 000 tons/a
<b>Products:</b>	Envelope paper, business forms (preprint), offset paper
<b>Furnish:</b>	Hardwood pulp, Softwood pulp, PCC
<b>Speed:</b>	1200 m/min

