

VENDOR ENGINEERING AB

1 PRODUCTION TECHNOLOGY

Since the establishment of pulp production the mill has undergone gradual capacity increase and process improvement. The current capacity of the mill is 150,000 t/a of bleached sulphate kraft pulp.

Exhibit 4-1: Pulp Mill

Production Processes

WOOD YARD

About 50% of the wood reaches the mill by railway and the remaining 50% by truck. All wood is delivered as roundwood already debarked in the forests. The operation of the wood yard is outsourced to a local company. Mill undertakes the maintenance of this facility.

Exhibit 4-2: Wood Yard and Chip Conveyor

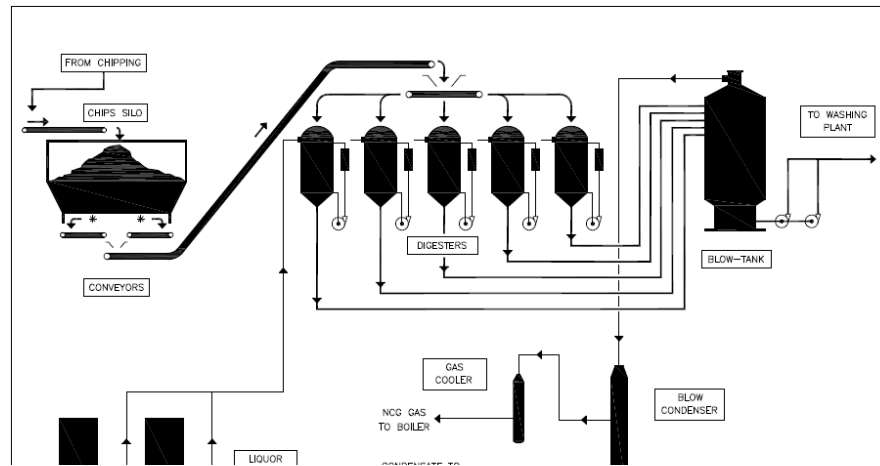
Mill has one wood chipper. In 2003, EUR 1.6 million was invested in modernizing the chipper system, including supporting conveyors and chipper feed table.

After chipping, the wood chips are fed to a vibrating screen and thereafter to the chip bin.

COOKING DEPARTMENT

From the chip bin, the chips are transported on a conveyor belt to the cooking department. The cooking line is of batch type and consists of five cooking vessels. The white and black liquor are added and heated to cooking temperature. When cooking is complete, the brown pulp is blown to a blow tank.

Exhibit 4-3: Cooking Department



The batch cooking process typically results in similar strength properties of the pulp as the continuous cooking process and adds flexibility to produce customer specific products.

Exhibit 4-4: Cooking Process Equipment

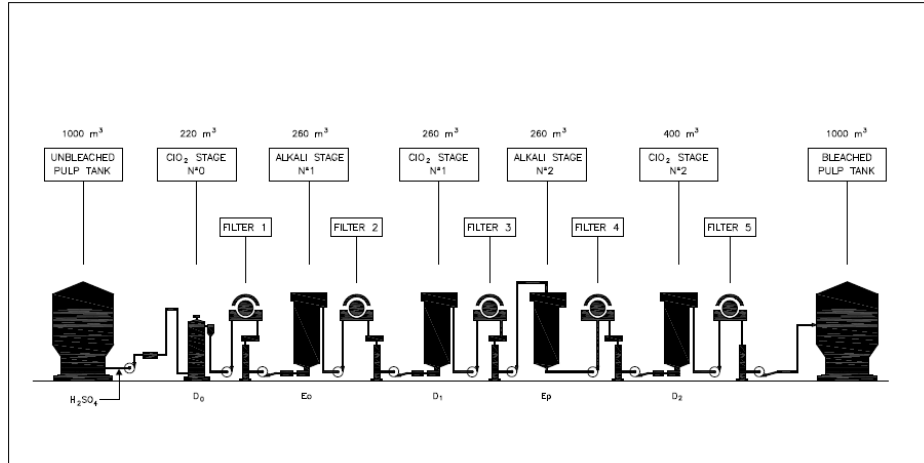
The screening is carried out in a three-stage system after a knotter.

After screening, the pulp is washed in a vacuum filter and 4-stage DD-washer installed in 2002.

BLEACH PLANT

The bleach plant has been in DEoDEpD configuration since 2001. The MC-pumps of the bleach plant were installed in 2003.

Exhibit 4-5: Bleach Plant



To supply the ECF bleach plant with bleaching agent, an Eka single vessel process (SVP) chlorine dioxide generator was installed in 2001.

Exhibit 4-6: Chlorine Dioxide Generator

The bleached pulp is pumped through a one stage centrifugal screen plus 4 cleaner stations and thereafter to a thickener.

PULP DRYING

The pulp dryer is a 2.4 m wide fourdrinier machine with three press stations and 96 drying cylinders. The capacity of the drying machine is approximately 370 ADt/day. A proportion of the pulp produced (ca. 15%) is fed to two dewatering presses. This pulp is sold to paper mills nearby at 45-50% dryness. All dried pulp is baled and unitised.

Exhibit 4-7: End Section of Pulp Dryer

RECOVERY SYSTEM

The mill houses two recovery boilers, RB1 and RB2, both operating at 30 bar pressure. RB1 has a current capacity of 310 tds/day while RB2 has a capacity of 170 tds/day.

The recovery boilers currently run at full capacity. The current investment program will increase the performance of the system, as described in section 8.

Key points are:

- Reducing the emissions to air from the recovery boilers to levels below the current limits.
- Increasing the energy efficiency. The dryness after evaporation will increase from current 52% dry solids to 70%.
- Reduced downtime from diminished cleaning time of the cascades, resulting in increased production capacity.

A system for collection and burning of strong gases from evaporators and digesters was installed in January 2005. Also in the same year, a stripping column for treatment and purification of condensates from digesters and foul condensates from evaporators was installed.

UTILITIES

In addition to the recovery boilers, the mill has a gas boiler with a steam producing capacity of 60 t/h. The current steam production on the gas boiler is 20 t/h.

There is a back pressure turbine with an installed capacity of 9.5 MW, with 6 MW currently generated. Currently the mill generates approximately 65% of its electricity needs.

Currently electricity generation at Mill does not qualify for the classification as green energy. The threshold for qualification as a green energy producer is based on generating over ca. 90% of electricity needs from renewable fuels. However, after the current investment programme the mill may achieve this classification, which will enable the company to sell its self generated electricity to the grid at a higher rate and repurchase its requirements at a lower rate.

The raw water treatment consists of a sand filter. Water is taken from the nearby river , providing more than adequate water for the mill.

The mill has also recently undertaken pre-feasibility studies for investments in a bark boiler, which would ensure the classification as a green energy producer.

In 2000/2001 detailed studies were carried out to install in the Mill a cogeneration power station of 50 MW (10 MW for self-consumption and 40 MW to sell to the network). Recent changes in legislation make these installations more attractive.

Environmental Permits

On September 27, 2007, an environmental licence for the mill was authorised by the regional administration. It is valid 8 years from the date of authorisation. Exhibit 4-4 shows the actual average levels of emissions in 2007 based on three measurements carried out by an external specialist party.

Exhibit 4-8: Current Limits for Emissions to Air from RB1 and RB2

	Unit	Current limit	New limit	Actual level, 2007
CO	ppm	1,445	500	445
NO _x	ppm	300	300	37
H ₂ S	mg/Nm ³	10.0	7.5	10.9
Particulates	mg/Nm ³	250	150	86
SO ₂	ppm	4,300	4,300	96
Opacity	° Bacharach	2	2	< 1

The mill's recovery boilers currently exceed the limit for H₂S. The levels for CO and particles are also high and can on individual measurements exceed the limits. The environmental license stipulates adaptation of the mill to the new levels by December 31, 2008.

The ongoing investment project addresses the emissions. Reductions in emissions of H₂S to 6.5 mg/Nm³ and of CO to 300 ppm, both below the new limits, form part of the warranties issued by the main supplier, Metso.

Exhibit 4-9: Current Limits for Emissions to Water

	Specific limits	Actual level 2007	Daily limits	Actual level 2007	Concentration limit	Actual level 2007
Flow	50 m ³ /Adt	47.5 m ³ /Adt	20,000 m ³ /day	19,256 m ³ /day	-	-
pH	-	-	-	-	6 - 9	7.4
TSS	2.5 kg /Adt	2.0 kg /Adt	1,000 kg/day	806 kg/day	50 mg/l	42 mg/l
COD	21.2 kg /Adt	19.3 kg /Adt	8,500 kg/day	7,813 kg/day	425 mg/l	406 mg/l
Colour	Non appreciated in a dilution of 1/30 with distilled water					

The mill has two aerated lagoons and a biological wastewater treatment plant. Since 2003, EUR 2.0 million has been invested in the wastewater treatment and a third lagoon has been removed.

The environmental licence granted in September 2007 included the obligation to present to the Regional Administration a detailed study of the potential soil degradations before May 2005, carried out by an external authorised firm. This study has been done and presented to the Administration at the end of April. The study has not indicated any significant soil degradation.

ISO Certification

On June 2, 2003 the mill was awarded the ISO 9001 certification for quality standards and this was followed up with the ISO 14001 environmental quality control on July 28, 2006.