

PANEL BOARD AND WOOD PULP APPLICATION

WOOD PULP EFFLUENT TREATMENT AND RECOVERY PLANT

CONVENTIONAL BIOLOGICAL SYSTEMS

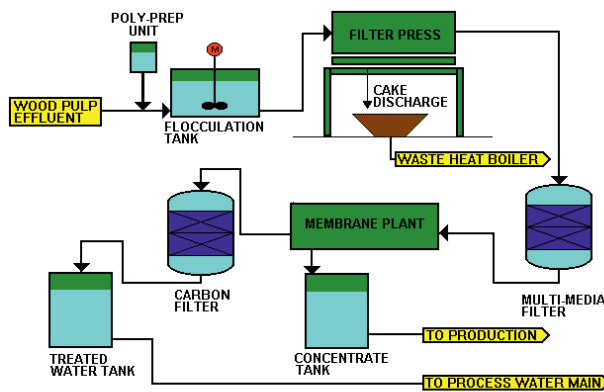
These systems are reaching the end of their product life cycle as they:

- are capital-intensive
- no longer satisfy the demands of the Environmental Agency or the Company Accountant
- produce two outputs, neither of which are amenable for recovery or re-use:
 - a low quality final effluent containing of inert solids, organic substances and residual biomass
 - waste activated sludge known as biomass.

THE “ZERO DISCHARGE” WOOD PULP EFFLUENT PLANT

The Esmil “Zero Discharge” Wood Pulp Effluent Plant combines the advantages of conventional physico-chemical processes with proven membrane technology. **All solid and liquid phase outputs are recoverable thereby resulting in a “zero discharge” plant.**

The plant can be substantially automated and an operator can be fully trained within a matter of weeks.



- **Permeate** for use as general site process water or boiler feed
- **Concentrate** for use as chemical make-up water
- **Solid Cake** for use in waste heat boiler

INNOVATION THROUGH DEVELOPMENT

Innovation was key in the following two areas:

- Development of the Reverse Osmosis membrane plant, which was carried out in association **Desalination Systems Inc** of the USA, the world’s largest supplier of speciality membranes.
- Formulation of a new polyelectrolyte for efficient flocculation of wood pulp effluent.

REFERENCES FOR MDF EFFLUENT TREATMENT:

- 1995 / 1999 – Kronospan Ltd., Chirk, North Wales, UK (2 projects), 250 m³/day / 450 m³/day
- 1996 – Kronospan Luxembourg S.A., Sanem, Luxemburg, 250 m³/day
- 1998 – Kronospan Szczecinek Sp. z o.o., Poland, 450 m³/day
- 1998 – Kronospan GmbH, Lampertswalde, Germany, 450 m³/day
- 1999 – CSC Forest Products Ltd., Sterling, Scotland, 650 m³/day
- 1999 / 2003 – Unilin SAS, Sedan Cedex, France (2 projects), 500 m³/day / 500 m³/day
- 2000 – Binderholz Bausysteme GmbH, Hallein, Austria, 450 m³/day
- 2001 – Interpanel S.A., Zamora, Spain, 250 m³/day
- 2001 - Financiera Maderera S.A., Padrón, Spain, 400 m³/day
- 2012 – PDK Apsheronsk JSC, Russian Federation, , 480 m³/day
- 2018 – Panel Plus Co., Ltd., Songhkla, Thailand, 500 m³/day

OUTPUT QUALITIES & RECOVERY OPTIONS

OUTPUT QUALITIES	
OUTPUT SOURCE	QUALITY
Ex Dual Media	<25 mg/l SS
Ex Membrane Plant	<25 mg/l SS
	<150 mg/l COD
Concentrate	~ 4.6% TDS
	~ 0.1% Volatile Solids
	~ 75,000 mg/l COD
	~ 20% Extractives
Ex Carbon Filter	~ 13.5% Lignin
	<25 mg/l SS
	<150 mg/l COD
	<20 mg/l Hardness

Note : The output qualities presented above are based on a similar plant designed and operated by Esmil Process Systems. Output qualities will vary according to the source and species of raw timber, the MDF manufacturing process and the operation of the plant.

RECOVERY OPTIONS

The **Esmil Plant** will be designed to achieve 90 - 95% water recovery and will generate three generic outputs, all of which are recoverable. The process outputs from both pre-treatment and the membrane plant are as follows:

Treated water (90 - 95%) may be recovered at various stages within the Esmil Plant and recycled to the manufacturing process

- **filtered water** leaving the multi-media filter may be of suitable quality for recycle as chip wash make-up water.
- **permeate leaving the membrane plant** may be of suitable quality for recycle for scrubber make-up water.
- **permeate leaving the activated carbon filter** (to further reduce COD) has a very low hardness and may be recycled to the existing boiler feed water ion exchange plant thereby releasing substantial savings on re-generation chemicals.

Concentrate (5 - 10%) may be either incinerated in the waste recovery boiler on site or re-used as resin make-up water. MDF manufacturers using concentrate as resin make-up water claim it enhances the board quality and lowers the requirement for synthetic resin.

NOTE the volatile solids only comprise 0.1% of sample indicating that concentrate is suitable for resin make-up water.

Filter cake with a high calorific value and a dry solids content of approximately 45%. The calorific value of the cake may be recovered by utilising it as boiler fuel.