

SSK Paper Mill Wastewater Treatment Plant

sustainable energy from sustainable paper

The SSK paper mill in Birmingham produces 190,000 tonnes per year of recycled liner and fluting grades for the UK packaging industry. In the existing treatment system, wastewater generated by the paper making procedure was processed through a dissolved air flotation unit that is designed to remove the majority of the solids from the wastewater, prior to discharging to local water authority, who then undertake further treatment before the water can enter natural water courses. Escalating treatment costs, governed by Ofwat, the government regulatory body, increased to levels where an onsite treatment plant at SSK became justifiable in terms of the capital investment required for the proposed wastewater treatment plant.



Anaerobic wastewater treatment plant

Courtesy of Veolia Water Solutions & Technologies

In July 2008 Smurfit Kappa SSK, part of the Smurfit Kappa Group, awarded Veolia Water Solutions & Technologies a major £2.7m wastewater treatment project, for their part in the design and construction of the system to treat the wastewater generated by the paper making process.

The Process

The wastewater treatment is based on a high efficiency anaerobic process, which reduces the majority of the dissolved organic load in the mill wastewater. The anaerobic treatment plant is followed by an aerated polishing stage and then finally, dissolved air flotation, for final clarification prior to safe discharge to the local sewer or re-use within the production process.

Anaerobic treatment has an impressive and proven track record in the paper industry, which is why Veolia Water Solutions & Technologies, working closely with Smurfit Kappa Paper engineers, selected anaerobic technology as the basis for a wastewater treatment solution at their site.

The biogas, a valuable by-product of the anaerobic treatment process, is treated by a biological desulphurisation plant to remove corrosive levels of hydrogen sulphide prior to use in the existing boilers.

The wastewater treatment plant consists of the following main process elements:



Get energy from waste



Pulp & Paper, Distilleries, Beer & Beverage, Food, Chemical Industry, Solid Digestion

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Anaerobic effluent treatment

- Industrial anaerobic effluent treatment
- Biogas / green energy from wastewater
- > 850 references and > 25 years of experience

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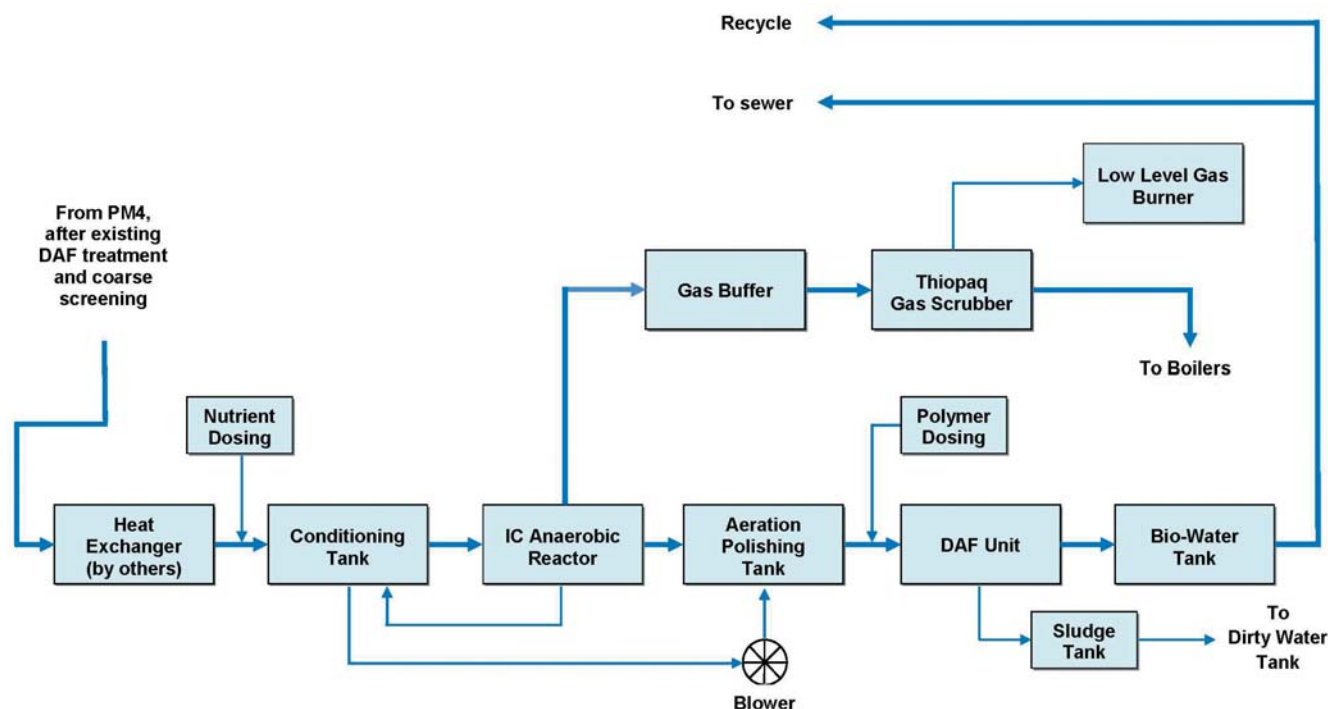
Cost effective H₂S removal

- Biogas desulphurization scrubber
- Making biogas suitable as energy source
- > 125 references and > 20 years of experience

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Anaerobic treatment plant process flow diagram

Courtesy of Veolia Water Solutions & Technologies

- The process at SSK has been designed to remove 80% of the chemical oxygen demand (COD) and further reduce the level of suspended solids in the treated wastewater, prior to discharge to the local water authority sewer, resulting in significant annual savings for SSK;
- Utilising the biogas in one of the existing boilers further reduces the sites energy costs, as less natural gas is required for the sites steam generation demand, helping to reduce the mill's carbon footprint;
- The wastewater treatment plant is controlled and monitored by a central control panel & PLC. The plant operates in line with mill production - 24 hours a day 7 days a week;
- Smurfit Kappa Paper is also considering the use of a CHP plant, as an alternative method of generating renewable energy from the biogas. As well as exporting "green energy" to the grid, the CHP plant would generate heat, which can be recovered for re-use, further contributing to energy conservation within the mill.

Reuse and Recovery

The anaerobic treatment plant has been in service from July 2009. A percentage of the biologically treated wastewater is reused within the mill to further reduce the systems COD. Biogas, which is a by-product of anaerobic treatment processes, is recovered, treated and used as an alternative energy source on site.

The Pulp & Paper industry

Veolia Water Solutions & Technologies (VWS) provides a wide range of technologies to treat water and wastewater for industrial and municipal clients. The company draws on innovative proprietary technology combined with traditional treatment methods. With over 1,000 references within the Pulp and Paper sector VWS understands the challenges these clients face.

Reliability of production: Water is a key component of the business activity and a reliable supply and a quality adapted specific needs is required.

Reduced water management costs: The market is driving competitiveness therefore increased savings on the cost of water is needed.

Protection of the environment: Preserving natural resources and limiting environmental impacts are essential for the pulp and paper industry.

Expertise and experience permits the identification of optimal solutions and the realisation of economies of scale:

- Reduction in water cycle costs;
- Optimisation of ratio of water consumption (m3) to production of pulp and paper (tonnes);
- Recycling of water and fibres according to a technical and economic optimum.

Implementation of innovative, reliable and proven solutions:

- Use of the FMECA (Failure Mode, Effects and Critical Analysis) and HAZOP (Hazard and Operability) analysis methods;
- Management through key performance indicators;
- Reliability of the pre-treatment water supply;
- Guarantee of effluent quality;
- Provision of a proactive technology survey through a dedicated R&D organisation.

Quality control to exceptional standards:

- Guarantee of continuous improvement in environmental management and compliance with regulations.

Veolia Water Solutions & Technologies' solutions include:

- treatment of raw water, removal of calcium, production of process water using high-rate clarification systems such as Actiflo™;
- treatment of boiler feed water by carbonate removal, demineralization, reverse osmosis;
- treatment of black liquors by multi-effect evaporation;
- removal of chloride and potassium by crystallization;
- fibre recovery using DAF (Dissolved Air Flotation.);
- using micro-filtration to recycle water used as part of the production process for pulp and paper;
- using physico-chemical, biological, aerobic, anaerobic and bio-filter applications to treat effluent, and reducing the amount of sludge and filamentous bacteria by using the MBP (Minimum Biosludge Production) process;
- using membranes to recycle waste in order to achieve "zero waste";
- treatment and dewatering of sludge using AF Table™, Screw Press.

Note: The Editor & Publishers thank Veolia Water Solutions & Technologies for preparing the above article for publication.■

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