

Pulp & Paper Industry

Background

- At Praxair, we are making our planet more productive. By providing industrial gases that are used in the processing of wastewater streams from pulp and paper manufacturing, our technologies allow facilities to reliably meet their wastewater treatment guidelines. Ultimately, Praxair is helping companies improve their productivity.
- Pulp and Paper manufacturing is water intensive, and as much as 40-60 m³ of water is utilized per air dried metric tonne of finished product. The wastewater from a P&P facility will contain contaminants such as carbohydrates from wood fiber or recycled paper, color compounds, solvents, organic acids, spent alkali, surfactants, reduced sulfur compounds and odorants like mercaptans and hydrogen sulfide. pulp & paper wastewater facilities are faced with a number of challenges in their operations, which may include:



High Strength Loads

Challenge: Chemical oxygen demand (COD) in pulp & paper wastewaters can range from about 300-1000 mg/l (30-100 lbs COD/ton of finished product). The high organic loading of pulp and paper wastewater implies that a significant amount of oxygen is required in a small footprint. This leads to a high oxygen uptake rate (OUR, mg O₂/L/hr) in the selector tank, and sometimes in the main aeration basin as well. At high OUR values (>50 mg/L/hr), aeration systems can become limited, leading to oxygen deficiencies.

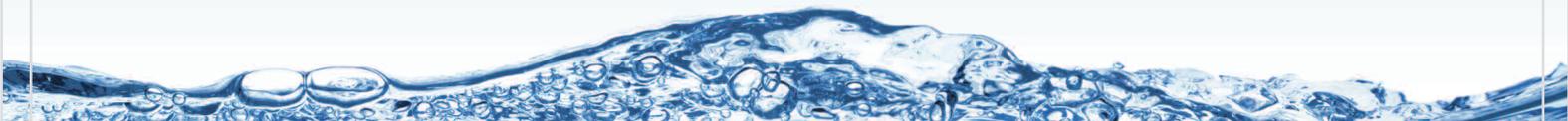
Praxair Approach: High purity oxygen and Praxair's oxygen delivery systems can reliably provide facilities with all of the oxygen needed in the process tanks. The range of oxygenation devices delivers oxygen exactly where and when it is needed. This ensures that facilities can meet their treatment goals and stay in regulatory compliance.

Sludge Bulking

O₂

Challenge: Sludge bulking is a major issue in most pulp & paper wastewater systems. Bulking can be caused by insufficient dissolved oxygen (DO) in selectors or the main aeration basin. It may also be due to an imbalance in the food to mass ratios (F/M) between the selector and the main aeration basin

Praxair Approach: Praxair's high purity oxygen (HPO) ensure that wastewater treatment systems obtain adequate amounts of needed oxygen, preventing DO deficiencies from occurring. Praxair has also developed a proprietary patent pending approach for operating Pulp and Paper facilities that ensures that organic loading and sludge quantities in the selector and main aeration tanks are optimized to mitigate bulking concerns.

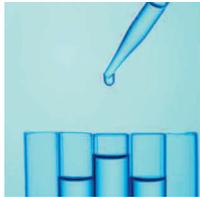




Sludge Reduction

Challenge: Pulp and Paper wastewater treatment facilities have high organic loads that can range from about 300 to 1000 g COD/m³. This corresponds to sludge generation of about 700-2100 lbs. solids per MGD of treated wastewater flow. Getting rid of these significant volumes of sludge can be costly. Facilities dispose of sludge by either sending it to landfills or burning up the sludge in the recovery boiler.

Praxair Approach: The costs of sludge disposal can be significant, and range from about \$200 to \$1000 per dry ton. Praxair's Lyso™ sludge ozonation system provides a reliable, cost effective way of helping facilities reduce their sludge volumes by as much as 80%. For facilities that burn their sludge in the recovery boiler, this can mean an increase in the capacity and efficiency of the recovery boiler.



Nutrient Recovery and Reuse

Challenge: Pulp and Paper wastewaters have high levels of organic carbon, but low levels of nitrogen and phosphorus. Most pulp and paper WWTP facilities purchase and add these nutrients to their wastewater treatment system at significant cost.

Praxair Approach: Using technologies like Praxair's Lyso™ sludge ozonation process, wastewater facilities can use ozone to rupture excess bacterial cells and release the nutrients. A typical bacterial cell will comprise about 10% of Nitrogen and 1-3% of Phosphorus, by weight. As much as 50% of the nutrient demand in a pulp and paper wastewater facility can be obtained by recovering and reusing nutrients through sludge lysis.

Conclusion

- Whether your wastewater treatment system is an extensive aerated lagoon, or a compact wastewater process, our technology offerings will provide you with effective and reliable treatment.
- Praxair's tested and proven wastewater offerings have been extensively deployed in a variety of food processing wastewater operations
- Call us today to discuss your particular wastewater treatment process needs, and let us help you improve your productivity.



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Praxair, Inc.
39 Old Ridgebury Road
Danbury, CT 06810-5113
USA

www.praxair.com
info@praxair.com

Telephone:
1-800-PRAXAIR (1-800-772-9247)
(716) 879-4077

Fax:
1-800-772-9985
(716) 879-2040