

Oxygen black liquor polishing systems enhance the performance of existing oxidation systems, while reducing TRS emissions.



OXYGEN BLACK LIQUOR POLISHING REDUCES TRS EMISSIONS

In kraft pulp mills, chemical recovery furnaces with direct contact evaporators are a major source of TRS (total reduced sulfur) emissions. Foul-smelling hydrogen sulfide — a key component of TRS — is generated when black liquor contacts hot flue gases.

Mills must reduce TRS emissions to control odor and meet strict EPA guidelines.

Airco's oxygen-based black liquor polishing system is the solution. It provides an efficient, inexpensive method of reducing TRS emissions to acceptable levels, and can easily be integrated into mill piping to enhance the performance of existing black liquor oxidation systems.

HOW CONVENTIONAL BLACK LIQUOR OXIDATION SYSTEMS WORK

In a conventional black liquor oxidation system, the black liquor is exposed to air. Oxygen in the air reacts with the sodium sulfide to form unreactive sodium thiosulfate, preventing formation of hydrogen sulfide. The black liquor is then evaporated, and burned.

Airco has developed a highly efficient black liquor polishing system in which pure oxygen, rather than air, is used to oxidize the sodium sulfide. The black liquor polishing system works in conjunction with your existing black liquor oxidation system to increase that system's capacity.

HOW THE AIRCO BLACK LIQUOR POLISHING SYSTEM WORKS

The Airco black liquor polishing unit uses a proprietary injection system to ensure intimate mixing of oxygen and the black liquor, so that the oxidation reaction is rapid and complete.

The oxygen is injected into the line downstream from the air-based black liquor oxidation system en route to the direct contact evaporators.

Depending on your plant configuration, the black liquor transfer line can often provide sufficient residence time to achieve the desired level of oxidation. If not, the black liquor can be diverted to an isolation loop or pipeline reactor where further polishing takes place.

OXYGEN POLISHING ADVANTAGES

■ **Low Capital Costs.** Because it can use existing mill piping, an Airco oxygen black liquor polishing system costs about 40% less to install than an equivalent air polishing system.

■ **No Foaming.** In conventional air polishing, the high inert gas content of air (78% nitrogen) can cause foaming, especially in mills using softwoods with high resin content. When black liquor foams, the liquid becomes more difficult to process and treat. With pure oxygen, all of the gas reacts, so there is no excess gas to cause foaming in the liquid.

■ **Energy Savings.** When air is used for polishing, excess nitrogen can cause undesirable cooling of the black liquor.

■ **No Venting of Gases to the Atmosphere.** In an air black liquor polishing system, there is a large volume of unreacted nitrogen that must often be treated to remove residual TRS prior to venting.

■ **Low Maintenance.** Because the oxygen black liquor polishing system has no moving parts, it is highly reliable and requires minimal maintenance.

■ **Fits Existing Space.** Airco oxygen black liquor polishing systems are compact and ideal for mills with limited space.

AIRCO CAN PROVIDE THE OPTIMAL SYSTEM FOR YOUR MILL

Airco pulp and paper engineers will provide a reliable, high-performance oxygen black liquor polishing system to ensure compliance with TRS emission limitations and eliminate odor problems. We design, manufacture, install, and start up the system, as well as provide your personnel with operator and safety training.

A WIDE CHOICE OF OXYGEN SUPPLY METHODS

Choosing the right oxygen supply method is critical to cost-effective black liquor polishing, since selecting the optimum method can significantly reduce the cost of gas supply. From bulk liquefied gas or pipeline delivery, to your own on-site vacuum swing adsorption (VSA) system or cryogenic generator, Airco can custom-tailor a gas supply method that is right for your mill, based on the oxygen requirements to meet your allowable TRS emission levels.

FOR MORE INFORMATION

To find out more about Airco's black liquor polishing systems and other pulp and paper applications using nitrogen, oxygen, ozone and carbon dioxide, contact Airco's Commercial Development department, Pulp & Paper group, in Murray Hill, NJ; telephone (908) 771-1744. Or, contact the Airco Gases regional sales office nearest you.



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