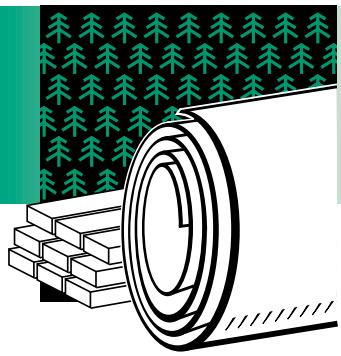
FOREST PRODUCTS

Project Fact Sheet



Fiber Loading for Paper Manufacturing

New process for manufacturing filler during pulp recycling reduces energy use, waste production, and CO_2 emissions

With its new "fiber loading" process, Voith Sulzer, Inc., is greatly improving the efficiency of paper production and recycling. Fiber loading produces precipitated calcium carbonate (PCC) filler in the pulp recycling process at costs below conventional means. Fiber loading allows papermakers to use as much filler, like PCC, as possible because it costs 80% less than fiber. In addition, increased filler and fines retention due to fiber loading reduces the quantity of greenhouse gas emissions, deinking sludge, and other waste while substantially lowering energy costs.

Currently, the most efficient way to produce PCC as filler is to make it in a satellite plant adjacent to a paper mill. Satellite plants exist near large scale paper mills (producing 700 tons per day) because the demand at large mills justifies building a costly ($15 million, average) satellite plant. This new fiber loading process combines the PCC manufacturing technology used in a satellite plant with the pulp processing operations of a paper mill. It is 33% less expensive to augment an existing paper mill with fiber loading technology than to build a satellite plant for the same purpose.

PCC Fiber Loading System

By improving paper recycling efficiency with its fiber loading process, Voith Sulzer is paving the way to substantial improvements in paper manufacturing efficiency that will benefit the environment and save the paper industry millions of dollars.

Benefits

Based on a unit with daily production of 500 metric tons of recycled paper (Projections by Voith Sulzer)

- Saves approximately 2.32×10^{11} Btu of energy per year through reduced need for paper drying and electricity for sludge de-watering
- Lowers solid waste production by about 13,500 metric tons; projected to be 364,000 tons by the year 2010 with 50% market penetration
- Decreases carbon dioxide emissions by nearly 6,805 metric tons through a diminished need for the de-watering and trucking of sludge
- Saves an estimated $3.1 million annually

Applications

This technology is applicable to the manufacturing of all printing and writing paper, regardless of the size or capacity of the paper mill.

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Project Description

Goal: Project goals are to install and test fiber loading equipment and to demonstrate to potential users the technical, energy, environmental, and economic advantages of fiber loading over the best current technology for producing PCC filler in the paper industry.

Fiber loading combines the PCC manufacturing technology used in the satellite plants of larger paper mills with the pulp processing operations found in all paper mills. Calcium hydroxide is added to moist pulp and reacted with carbon dioxide in a pressurized refiner under carbon dioxide pressure to form PCC. This is more efficient than existing satellite plant technology partly because the pressurized refiners used for pulp processing can be simultaneously used as a chemical reactor (for precipitating PCC) and as a contaminant dispersion unit. Fiber loading also eliminates the need for a satellite plant to manufacture PCC slurry.

Preliminary industrial scale demonstrations show that recycled pulp from wastepaper can be fiber loaded, resulting in increased brightness, improved color, and substantially reduced residual ink and contaminants. Internal incorporation of this filler along with the attraction of the natural positive charge of PCC made from the fiber loading process to the negatively charged pulp fibers results in increased filler retention during recycling. This process lowers the amount of generated wastes.

Voith Sulzer, Inc., is demonstrating this new technology with assistance from the Wisconsin Division of Energy and Intergovernmental Regulations and the Nice^3 Program through the Department of Energy's Office of Industrial Technologies.

Progress and Milestones

- Constructed demonstration site.
- Demonstrated and documented the benefits of the fiber loading technology to verify energy, waste, and cost savings.
- Conducted market research to identify market opportunities.
- Implemented marketing plan to bring fiber loading technology to commercialization.

Industry of the Future—Forest Products and Agenda 2020

*In November 1994, DOE's Secretary of Energy and the Chairman of the American Forest and Paper Association signed a compact, establishing a research partnership involving the forest products industry and DOE. A key feature of this partnership was a strategic technology plan—**Agenda 2020: A Technology Vision and Research Agenda for America's Forest, Wood and Paper Industry.** Agenda 2020 includes goals for the research partnership and a plan to address the industry's needs in six critical areas:*

- *Energy performance*
- *Environmental performance*
- *Capital effectiveness*
- *Recycling*
- *Sensors and controls*
- *Sustainable forestry*

For each of these areas, task groups including industry, university and government representatives have developed detailed research agendas called research pathways—all of which are consistent with Agenda 2020's goals.

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NICE^3—National Industrial Competitiveness through Energy, Environment, and Economics: An innovative, cost-sharing program to promote energy efficiency, clean production, and economic competitiveness in industry. This grant program provides funding to state and industry partners for the first commercial demonstration of energy efficient and clean production manufacturing and industrial technologies. Total project cost for a single award must be cost-shared at a minimum of 50% by a combination of state and industrial partner dollars. The DOE share for each award shall not exceed $500,000 to the industrial partner and up to $25,000 to the sponsoring state agency for a maximum of $525,000.

Project Partners

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