



White Liquor

Polysulfide Liquor

### FEATURES AND BENEFITS

- mill proven process, simple and robust
- pulp yield Increased by 2-3% resulting in wood savings of 4-6%
- potential to reduce kappa number while still increasing yield, resulting in 10-30% lower bleaching costs and lower AOX, BOD, COD
- potential to increase mill throughput by up to 8-12%
- Improved pulp properties including beatability, bonding, fibre strength and cellulose molecular weight



Paprilox® Retrofit of Existing Causticizers

Paprilox® is a simple, low-cost process to generate polysulfide, a chemical which enhances the yield of chemical pulp. Developed and patented by Paprican, Paprilox® was first implemented in a Paprican Member Company mill and is now available from NORAM.

Polysulfide is well known for its yield enhancing properties, but until now, the processes available for its production have been relatively expensive and application has occurred primarily in Japan where wood costs are especially high.

The Paprilox® process can be integrated within the recausticizing system, rather than requiring a completely new unit operation. The capital cost and operating costs of Paprilox® are very attractive, resulting in payback periods as short as six months for North American sites.

Paprilox® polysulfide works well alone but due to a synergy of yield and pulping rate enhancements it is usually used together with anthraquinone. If your mill is using AQ now, additional yield benefit can be obtained through Paprilox®. If recaust system improvements are needed, but project returns are minimal, Paprilox® can provide a positive return for the overall project.

Research by Paprican is uncovering new attributes of polysulfide pulps. In addition to well-known characteristics of easier beating and better bonding pulps, researchers have shown that polysulfide improves cellulose molecular weight and fiber strength.

# NORAM Engineering and Constructors Ltd.



## COMPANY PROFILE

NORAM is an engineering and technology development firm based in Vancouver, Canada. Founded in 1988, NORAM employs a highly qualified technical staff of approximately one hundred. NORAM has a global client base and has successfully completed projects on five continents.

Today NORAM is the world's leading supplier of mononitrobenzene (MNB) plants, a key intermediate in the production of polyurethane. In addition, NORAM offers sulfuric acid equipment, biological treatment facilities, energy systems, and technologies for the chemical, minerals processing, environmental, and pulp & paper industries.

NORAM offers proprietary technology to customers through engineered equipment and complete chemical plants. NORAM's core competencies include:

- Biological Treatment Technologies
- Electrochemical Systems
- Energy Systems
- Environmental Technologies
- Feasibility Studies
- Fluid Dynamics & Finite Element Analysis
- Heat Transfer Systems Design
- Nitration Technology
- Project Management
- Pulp & Paper Technologies
- Sulfuric Acid Manufacture

## PARTNERING WITH INNOVATION AND EXPERIENCE

NORAM is focused on the development, commercialization and supply of established and novel processes. With its entrepreneurial culture, NORAM has a demonstrated track record of thinking outside the box to provide innovative solutions. Technologies can be evaluated and integrated into an advanced engineering solution based on first principles.

NORAM has made its mark internationally by supplying proprietary systems to various industries world-wide. NORAM can bring this expertise and innovative ideas to your projects.

NORAM has established strategic relationships with the following organizations:

- ◆ Bateman Engineering BV
- ◆ Canadian Hydrogen and Fuel Cell Association
- ◆ Eco-Tec
- ◆ First Chemical Corporation (A DuPont Company)
- ◆ FP Innovations
- ◆ Kemetco Research Inc.
- ◆ Membrane Reactor Technologies
- ◆ Ostara Nutrient Recovery Technologies Inc.
- ◆ Radient Technologies
- ◆ Siloxy Limited
- ◆ Simon Carves Limited (Punj Lloyd Group)
- ◆ The Electrosynthesis Company

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