

# Turpentine Recovery

Safe and Efficient By-Product Recovery

In the softwood Kraft process, significant quantities of crude turpentine are released via the digester system.

In a continuous digester system the turpentine and Total Reduced Sulfur (TRS) gases are transported with the steaming vessel vent and No. 2 flash steam. In a batch digester system they are contained in the relief steam. Turpentine is a valuable by-product, either to sell to chemical processors or to burn as a fuel.

### System description

Relief steam from the digester(s) enters the relief separator where entrained fibres are removed by cyclonic action. The hot turpentine vapors, NCG and steam then flow to the primary condenser where the steam is partially condensed. A fixed flow of steam, which includes virtually all the original turpentine and TRS, exits the primary condenser overheads and enters the secondary relief condenser. More water vapor plus all the turpentine is condensed here and the remaining vapour/NCG is cooled to at least 60°C (140°F). The vapour/NCG from the secondary condenser is further cooled in a direct contact gas cooler and the remaining non-condensables are collected in the CNCG/LVHC collection system.

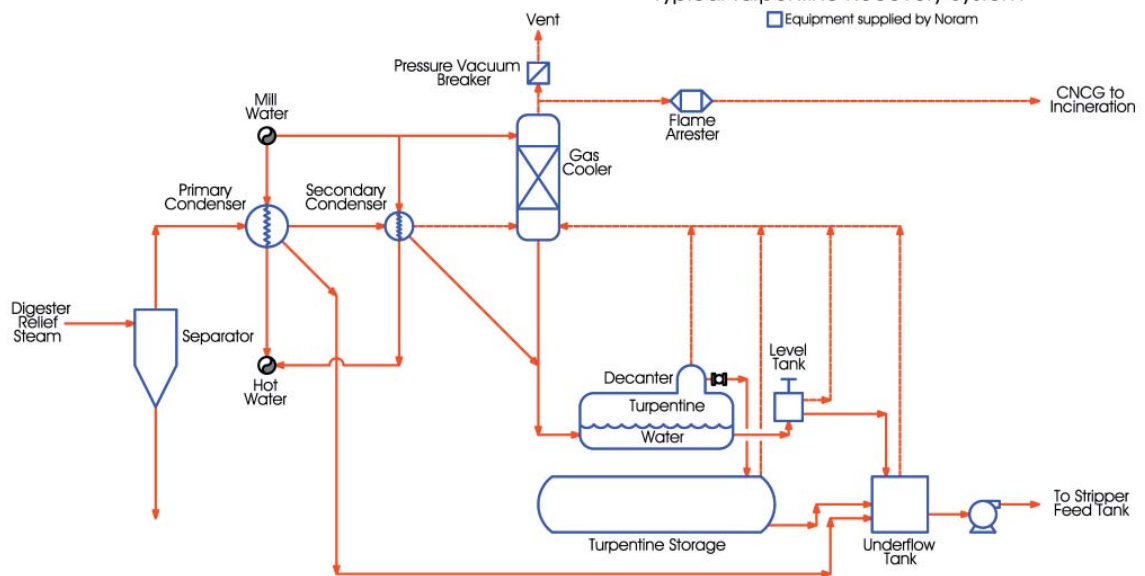
### Features and benefits

- condenses the turpentine into a condensate stream that is less than 30% of the total incoming vapor flow
- produces hot water at a temperature suitable for process use
- high purity turpentine product

The second stage condensate, now free from solids, liquor and soap, flows into a decanter where the turpentine phase rises up and is recovered via a continuous overflow from the decanter to a storage tank. The heavier condensate phase flows continuously via an underflow tank and is treated in a condensate stripper or hard-piped to effluent treatment. An adjustable level device on the condensate underflow line maintains the interface level between the two phases in the decanter. Typically the decanter, underflow and storage tanks are contained in a dyked area.

Typical Turpentine Recovery System

□ Equipment supplied by Noram



Turpentine Recovery System

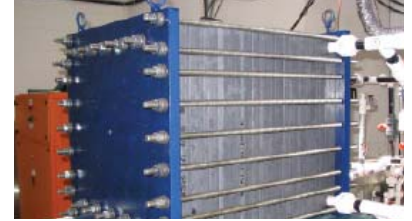
# technology and engineering solutions for the process and resource industries



Nitration



Sulfuric Acid



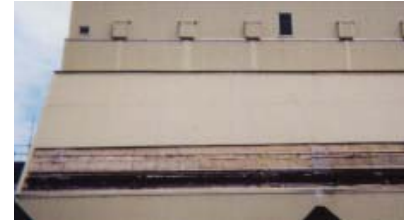
Electrochemical



Biosystems



Pulp&Paper



Environmental

## Company Profile

NORAM is a private engineering and technology firm based in Vancouver BC, Canada. We specialize in the development, engineering and commercialization of new chemical processes, and in the improvement and optimization of existing technologies. Since 1988 NORAM has provided leading-edge technologies to the chemical, pulp and paper, minerals processing, wastewater and electrochemical industries.

Today NORAM is the world's leading supplier of nitration technology. In addition, we offer sulfuric acid plants, biological treatment facilities, energy systems, and technologies for the clean-tech sectors.

Our business has developed around the supply of proprietary engineering and equipment packages to our clients.

Core competencies include:

- Nitration and NO<sub>x</sub> Technology
- Electrochemical Systems
- Sulfuric Acid Manufacture
- Biological Wastewater Treatment
- Computational Fluid Dynamics & Finite Element Analysis
- Heat Transfer & Heat Exchangers
- Hydrogen, Sulfur and Chlorine Chemistry
- Fluidised Bed Systems
- Energy Storage
- System Closure

## Partnering with Innovation and Experience

NORAM works extensively with early-stage technology companies. We draw on established competencies in process design and engineering, provide custom in-house fabrication capabilities, and offer pilot plant and contract research facilities to support the commercialization process.

We've teamed up with organizations around the globe to allow project execution on 5 continents. Our strategic relationships include:

- Bateman Engineering BV
- Canadian Hydrogen and Fuel Cell Association
- ECO-TEC Inc.
- First Chemical Corporation (a DuPont Company)
- FP Innovations
- Kemetco Research Inc.
- Membrane Reactor Technologies
- Ostara Nutrient Recovery Technologies Inc.
- Radiant Technologies Inc.
- Siloxy Limited
- Simon Carves Ltd (Punj Lloyd Group)
- Electrosynthesis Company Inc.

www.noram-eng.com



NORAM Engineering and Constructors Ltd.

Suite 1800 - 200 Granville Street  
Vancouver, British Columbia  
Canada V6C 1S4

Telephone: +1.604.681.2030  
Facsimile: +1.604.683.9164