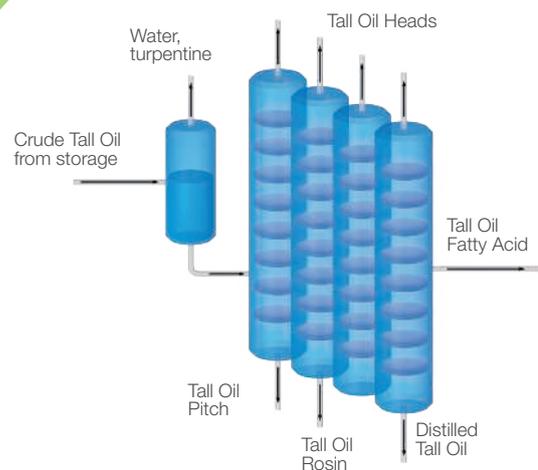
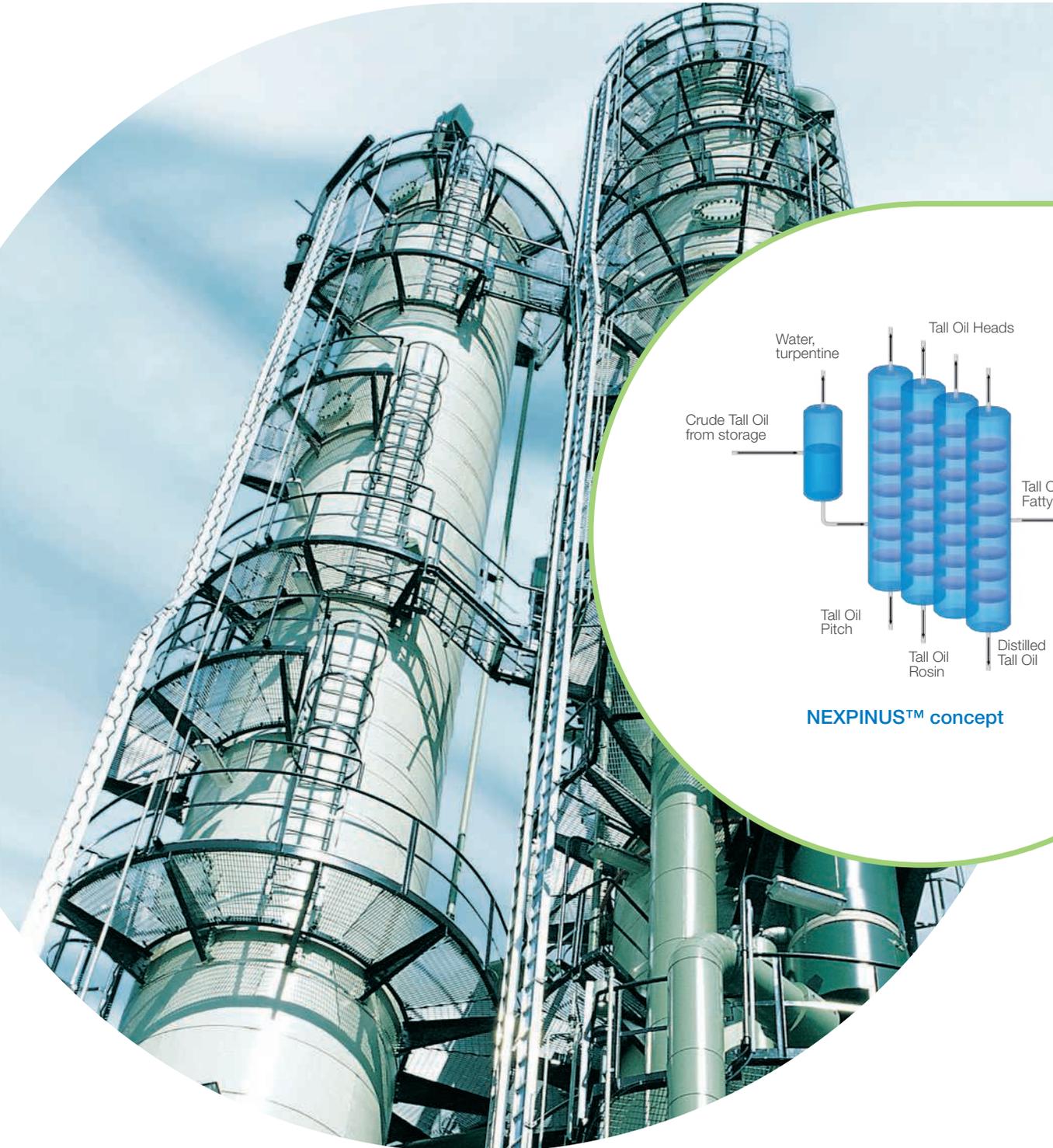


**NEXPINUS™**

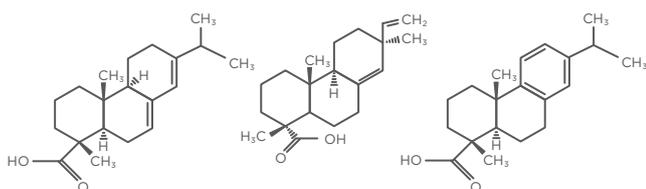
# Bioproducts From Intelligent Tall Oil Technology



**NEXPINUS™** concept

## Feedstock Flexible Tall Oil Technology For Superior Quality Products

**Ever-growing need for renewable fuels has increased interest in using tall oil as raw material. Simultaneously end users demand better quality tall oil products, which cannot, however, be achieved with refining technology based on unreliable and deficient published property data. The winning choice is the proven solution from the leading technology provider, based on reliable modelling of mass and energy balances as well as dynamic plant behavior.**



From left to right – abietic acid, pimaric acid and dehydroabietic acid, three common rosin acids.

Other tall oil components: fatty acids like palmitic, linolenic, linoleic and oleic acids and neutral components like sitosterol, campesterol and squalene.

TOP (tall oil pitch). The NEXPINUS™ process normally consists of the following process phases: Drying, Depitching, Rosin distillation, Heads distillation and TOFA distillation. An additional DTO distillation step is added if justified. For fuel raw material production the process applies similar technology.

Dehydration takes place in moderate vacuum and at 120–170 °C temperature. The rest of the process operates in deep vacuum and temperature between 220–280 °C. Depitching is accomplished by thin film evaporators and/or a distillation column. Downstream distillation columns utilize advanced design with special arrangement of high efficiency packing to ensure maximum separation efficiency at low pressure drop.

Product quality is finetuned to the demands of further processing. TOFA and DTO are mainly consumed in various detergents and soaps. They are also used for manufacture of alkyd resins. TOR is consumed for paper coating chemicals, and also for inks and adhesives. TOP and heads fractions are nowadays mostly used as fuels.

### Process Solution

Crude tall oil (CTO) is a side product from chemical pulping of pine and other wood species, mostly coniferous trees. Tall oil fractionation yields many valuable products, such as TOR (tall oil rosin), TOFA (tall oil fatty acids), heads, DTO (distilled tall oil) and

### Benefits

#### Raw Material Flexibility

- Wide range of crude tall oil grades (from US-American grades with high acid value to Scandinavian grades highly diluted by unsaponifiables, esters and undesired fatty acids).
- Raw material specific process solutions with flexible design.

#### Solid and Proven Design

- In-house process simulation model with own physical property data library of all relevant tall oil components, most of which are not available in public databases.
- Superb product yields and purities are achieved by accurate modelling of undesired chemical reactions as esterification, dimerization, decarboxylation, isomerization and anhydride formation.
- Correct prediction of mass and energy balances
- CFD-modelling of flows inside the columns and evaporators ensures smooth flow patterns.
- Guaranteed and thoroughly proven performance.

#### Special Design Considerations

- High melting point of rosin requires proven engineering solutions to avoid crystallization.
- Winterization solutions for hard climatic conditions ensure smooth continuous operation.
- Gentle heating and reboiling is needed due to fouling and heat sensitivity of the process media.
- Solutions enable low residence times to ensure excellent product yields.
- Easy operability with highly advanced control system.
- High availability due to approved equipment selection.

#### Innovative Design

- Creative separation concepts are applied as feasible.
- Extra hard rosin can be produced with special solutions.
- Proprietary deep vacuum distillation techniques applied.
- Specific process know-how related to valuable neutral components as sterols and stilbenes involve patented solutions.

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