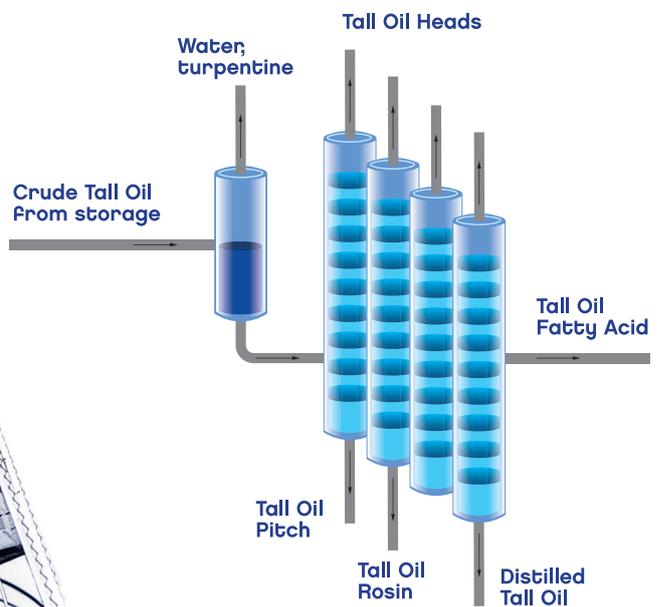
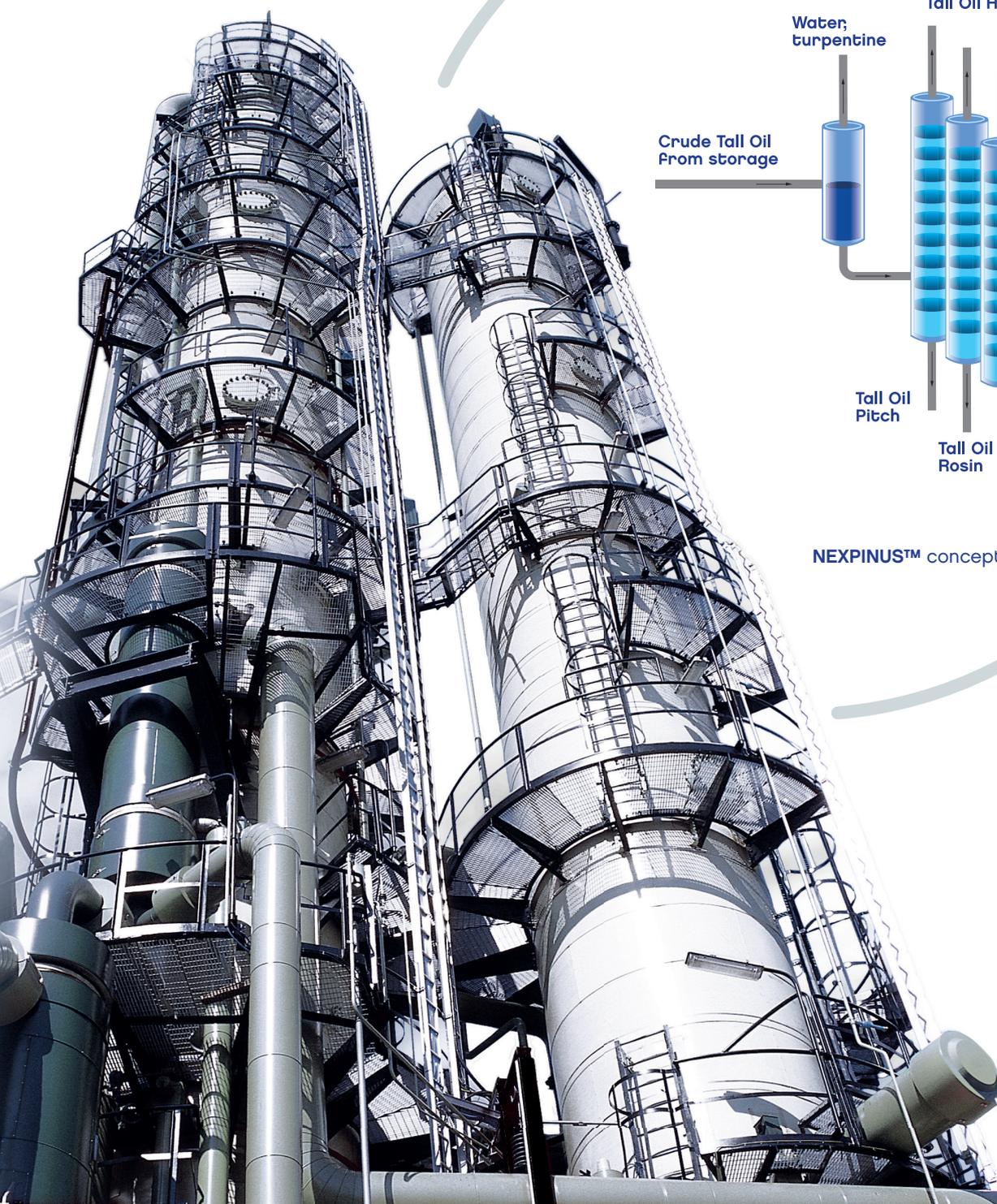


NEXPINUS™

# Intelligent Tall Oil Fractionation Technology



NEXPINUS™ concept

# Feedstock Flexible Tall Oil Fractionation Technology for Premium Quality Products

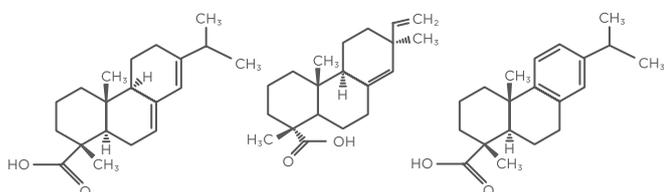
Growing need for renewable fuels and chemicals has increased interest in using tall oil from chemical pulping as raw material. Moreover, end users demand better quality tall oil products, which can only be achieved with reliable refining technology based on advanced modelling and validated property data. The winning choice is the proven market leading process technology with multiple commercial references from the key technology provider in the field.

## Process Solution

Crude Tall Oil (CTO) is a side product from chemical pulping of pine and other wood species, mostly softwood trees. Tall oil fractionation yields many valuable products, such as TOR (Tall Oil Rosin), TOFA (Tall Oil Fatty Acid), CFA (Crude Fatty Acid), tall oil heads, DTO (Distilled Tall Oil), TOP (Tall Oil Pitch) and crude turpentine. The NEXPINUS™ process normally consists of the following process steps: Drying, Depitching, Rosin distillation, Heads distillation and TOFA distillation. An additional DTO distillation step is added if justified. Both for renewable fuels and chemicals raw materials the process applies similar production 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 and proprietary tailored internals to ensure maximum separation efficiency at low pressure drop.

Product qualities are finetuned according to requirements of further processing. CTO fractions are used in a wide array of applications, such as detergents and soaps (TOFA), adhesives, road markings and inks (TOR), energy generation and asphalt emulsifier (TOR), and rubber emulsifiers and lubricants (DTO). An evermore trending main consumer is the production of renewable fuels (CFA, TOFA, tall oil heads).



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.

## 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 customized process solutions with optimized design.

### Solid and Proven Design

- Verified 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.
- End-to-end guaranteed and thoroughly proven performance.
- Proprietary key equipment internals based on rigorous CFD-modelling ensure the demanded process performance.

### Special Design Considerations

- High melting point of rosin requires proven engineering solutions to avoid solidification.
- 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 readily available highly advanced control system.
- High availability ensured by careful experience-based equipment choices.

### Innovative Design

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

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