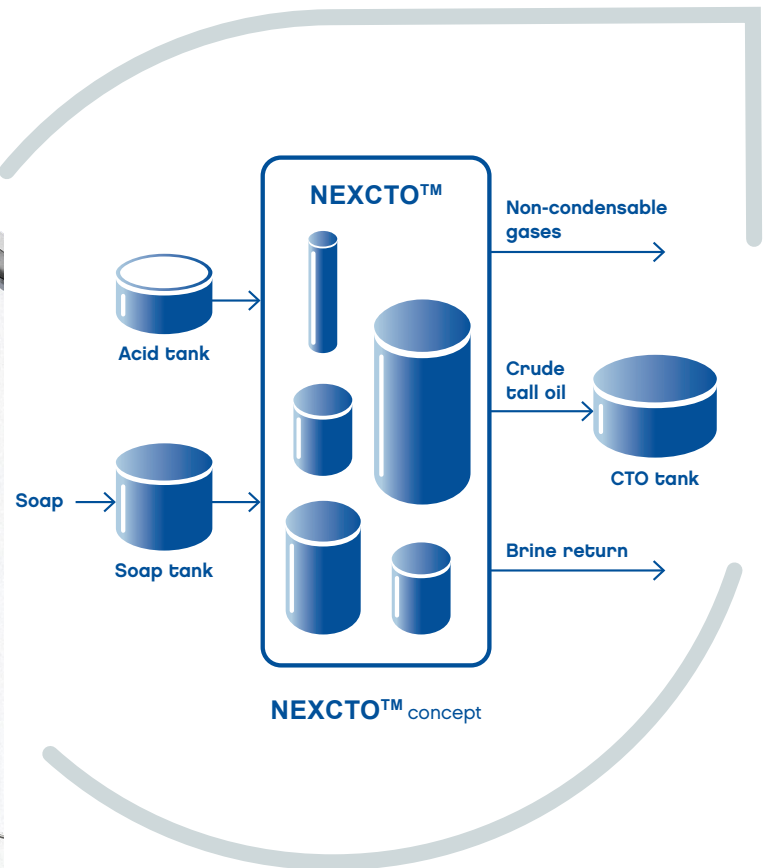


NEXCTO™

Robust acidulation technology For crude tall oil production



Value adding modular technology solution For crude tall oil production

Growing demand for renewable fuels and chemicals presents a significant opportunity to utilize tall oil fractions as raw materials. However, limited crude tall oil (CTO) availability and outdated acidulation processes currently hinder its full potential. A robust, continuous, and easy-to-operate technology that accepts varying feedstock qualities enables efficient production of CTO and opens up previously untapped CTO to the market.

Process Solution

Neste has leveraged its NEXPINUS™ intelligent CTO fractionation technology expertise to develop with a partner the NEXCTO™, an improved acidulation technology. NEXCTO is a fully continuous black liquor soap (BLS) acidulation process with a proprietary separation technique. The solution is delivered as a modular, engineered, procured, fabricated, and factory acceptance tested unit, offering fixed costs and schedules while shortening the time to market for the owner.

BLS is pumped from soap storage directly to the acidulation process; where the reaction starts immediately, followed by the phase separation. The process is robustly designed to handle varying

compositions of hardwood and softwood soaps. The resulting crude tall oil (CTO) obtained is collected in a dedicated CTO pumping tank and sent further to storage. The non-condensable gases are processed in a scrubber and then returned to the pulp mill. Neutralized brine is also returned to the pulp mill.

High-quality CTO produced in the NEXCTO acidulation process is ideal for further fractionation. CTO fractions are suitable for a wide array of applications such as renewable fuels and chemicals.



Benefits

Project benefits

- EPF (engineered, procured, and fabricated) and factory acceptance tested (FAT) modular unit with fixed cost and schedule will shorten the time to market by minimizing the time for engineering, site installation and commissioning.
- Pre-engineered standard sizes for BLS feed capacity speed up the overall schedule.
- End-to-end guaranteed performance by reliable licensor Neste.

Economical benefits

- Standardized design improves business case accuracy, and accelerates project delivery and subsequent return for investment.
- NEXCTO standard delivery includes spare parts for 2 years.
- The continuous NEXCTO process has low maintenance costs and utility consumption.
- Neste is open to exploring off-take options to improve project financing.

Design Benefits

- The proprietary NEXCTO design allows high CTO yield with both softwood and mixed softwood+hardwood soaps.
- Robust and reliable technology - proven in long-term, commercial scale operations.
- Specialized, proprietary technology solutions available from the same licensor for the downstream value chain phases.
- Neste, as the Licensor, ensures ongoing continuous improvements.

Operational benefits

- A wide operation range, if necessary the NEXCTO unit can be operated continuously with a significantly wide turndown ratio.
- High availability.
- Easy operability featured with remote monitoring capabilities.
- The NEXCTO unit's modular construction allows for easy and rapid relocation when necessary.