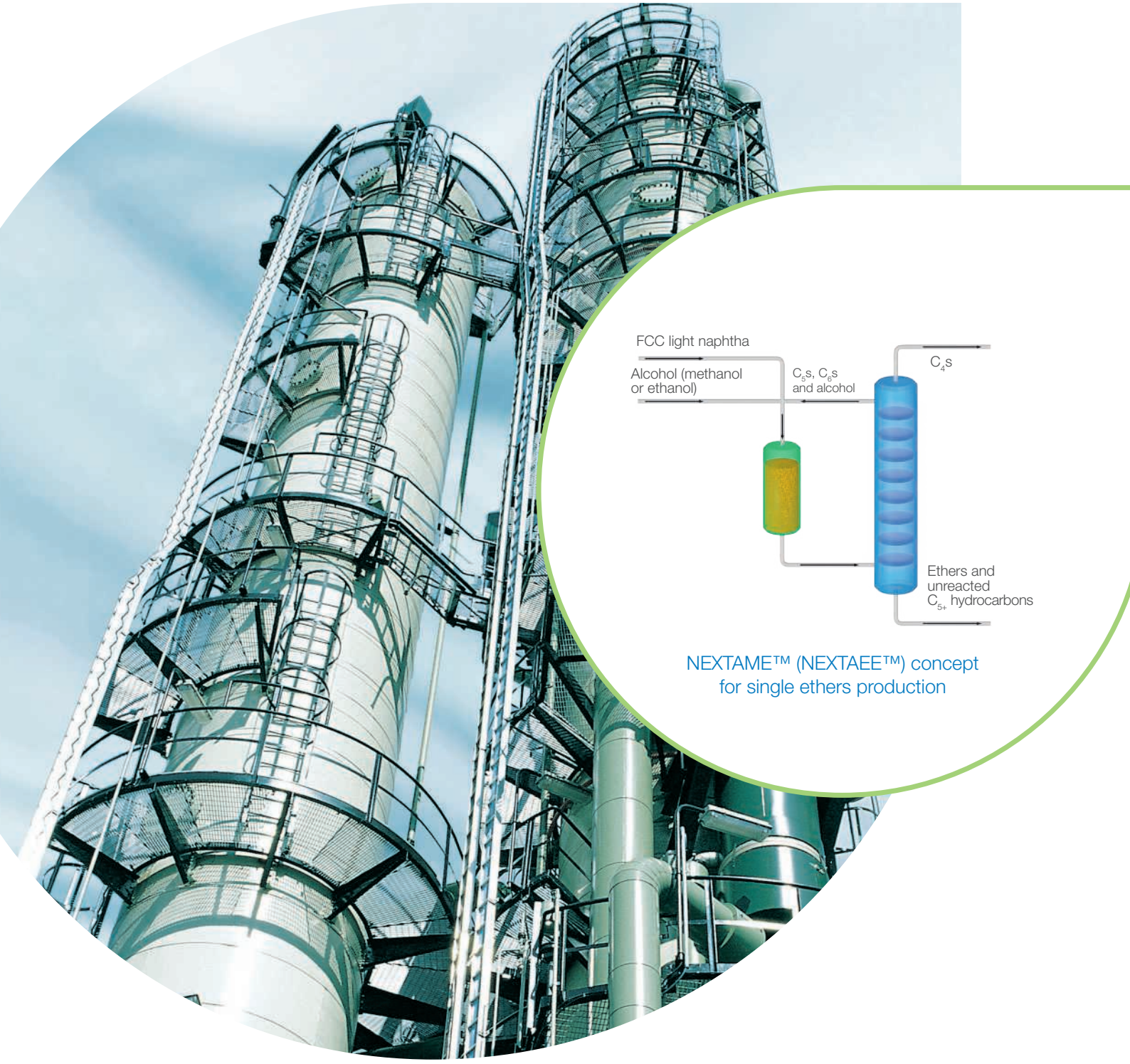
NEXTAME™ and NEXTAEE™

Maximum Ethers Production from Cracked Naphtha



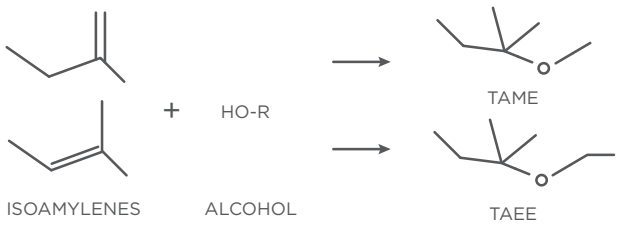
NEXTAME™ (NEXTAEE™) concept for single ethers production

NESTE

NEXTAME™ and NEXTAEE™

Maximize TAME or TAEE and Heavier Ether Output

All gasoline fuel producers face today the challenge of achieving current and future specifications with high availability at low cost. Need for profitable solutions for upgrading cracked naphtha stream value to modern gasoline standards is increasingly growing. With reliable process, a wide range of fuel ethers will be the optimum blending stock for gasoline pool – now and in the future.



Tert-C5 olefins + methanol	TAME
Tert-C6 olefins + methanol	THxME
Tert-C7 olefins + methanol	THpME
- " - + bioethanols	equiv. bioethers

Process Solution

In the NEXTAME™ and NEXTAEE™ processes, an optimized cut of tertiary C5–C7 isoolefins and alcohol, either methanol or ethanol react in the presence of a cation ion exchange resin catalyst. A mixture of fresh feed and recycle stream is led to etherification reactors. By doing so, the ratio of alcohol to reactive isoolefins in the reactor feed is enhanced resulting in an increased yield of ethers.

Reactor effluent is routed to a main fractionator. The ether yield is enhanced by taking a side draw from an optimized location and changing it back to reactor section. The loss of alcohol to the overhead product is effectively limited by C4/alcohol azeotrope in the top of the column. Thus, alcohol can only leave the column from the sidedraw point. The bottom product of the distillation column contains all formed fuel ethers and inert gasoline grade hydrocarbons, but only a limited quantity or no alcohol, and is thus perfectly suited for gasoline blending without any further treatment.

The overhead product consists of C4 hydrocarbons present in the feed and an azeotropic amount of alcohol. Typically the distillate is less than 2% of the feed. Due to its low alcohol content, this stream can be mixed directly with the bottoms product or it can be directed to the alcohol recovery section of an existing MTBE or ETBE unit.

Benefits

The Flexible Ethers Technology

- The capability to process any feed in the C5 to C7 range with only loose requirements for pre-distillation.
- The optimum technology for processing of tertiary olefins in C5 to C7 range present in cracked naphtha streams.
- Extremely high TAME/TAEE, THxME/THxEE and THpME/THpEE yields at reduced cost, using low maintenance equipment.
- Complete freedom to choose between methanol and ethanol.

Economic Benefits

- C5–C7 etherification with integrated alcohol recovery – maximum quality improvement at low Capex.
- NEXTAEE™ provides a low cost way to produce biofules in petroleum refinery.
- Existing MBTE and TAME units upgradable to NEXTAME™ and NEXTAEE™technologies for substantially enhanced ethers production.

Easy Operability

- Individually controlled reactor temperatures ensure high ether yield with minimal side product formation.
- Conventional catalyst available from several sources, simple loading procedures.
- Excellent availability and track record for easy operation.

Yields & Conversions

Design yields and conversions are subject to optimization. Typical values are:

TAME	91%	TAEE	85%
THxME	68%	ThxEE	45%

THpME	25%	ThpEE	20%
Methanol	99.5%	Ethanol	99.7%

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