

Sustainable aviation fluid (SAF) and heat transfer systems

Overview and importance

Industry adoption and policy influence

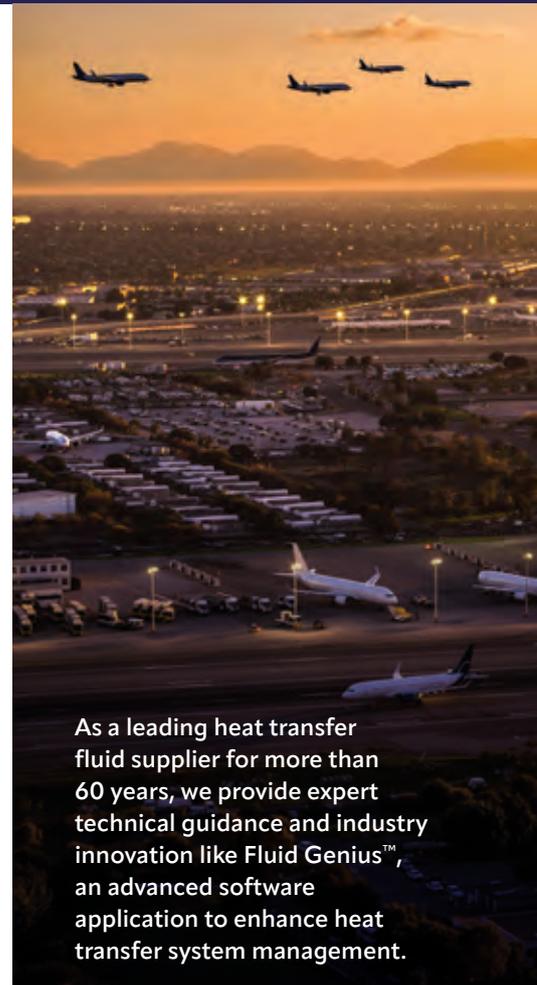
Airlines and aviation stakeholders are evaluating SAF as a drop-in alternative that has lower emissions over its life cycle. Policy frameworks, incentives and voluntary industry commitments across markets inform investment and deployment decisions. A combination of public- and private-sector interest is creating a potentially robust market for investment.

Investment, technology and feedstock

Project activity and capital interest in SAF production continues in multiple regions. Technological pathways attracting attention include hydrotreating/HDO, gasification and Fischer-Tropsch synthesis (FTS), power-to-liquid technologies (electrolytic hydrogen and captured CO₂), and fermentation plus upgrading routes. Diversified feedstocks — including waste-derived oils and other residual biomass streams — and advances in conversion and pretreatment technologies are important for improving process viability, catalyst life and scalability.

Market state and industry implications

The SAF sector remains at an early stage but is scaling with increasing production activity. Aviation's growing emphasis on sustainability — both through government mandates and airlines' desires to hit environmental targets — is expected to support further market expansion.



As a leading heat transfer fluid supplier for more than 60 years, we provide expert technical guidance and industry innovation like Fluid Genius™, an advanced software application to enhance heat transfer system management.



Key chemical processes

- Hydrodeoxygenation (HDO) removes oxygenated compounds from feedstock, reacting with H₂ at high temperatures (typically 250°–400°C) and pressure. Isomerization operates at 250°–420°C.
- FTS typically happens at 220°–240°C; front end could include fermentation to ethanol.

Global water depletion is caused by population growth, climate change and unsustainable farming. It leads to competition for water and damage to ecosystems, making the use of water in heat transfer systems unsustainable. **Heat transfer fluid** (thermal oil) is a cost-effective, reliable and water-free means of providing energy for different chemical processes, making process heating more sustainable.

Hydrotreating/isomerization process-flow diagram



Simplified waste gasification process flow diagram



High-temperature HTF Medium-temperature HTF

Eastman provides a wide range of Therminol® and Marlotherm® high-performing synthetic heat transfer fluids and world-class technical service.

Eastman heat transfer fluids for alternative energy and technologies

Application	Heat transfer fluid
Renewable diesel	Therminol 55, Therminol 66, Therminol 68, Therminol 72, Therminol VP-1
Biofuel manufacturing	Therminol 55, Therminol 59, Therminol XP, Therminol 62,* Therminol 66, Therminol 72, Therminol VP-1, Marlotherm SH, Marlotherm LH
Biomass	Therminol 55, Therminol 59, Therminol 62,* Therminol 66, Marlotherm SH
Waste heat recovery	Therminol SP, Therminol 59, Therminol 62,* Therminol 66, Therminol 72, Marlotherm SH, Marlotherm LH
Organic Rankine cycle (ORC)	Therminol SP, Therminol 55, Therminol 59, Therminol 62,* Therminol 66, Marlotherm SH, Marlotherm LH

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How does Eastman support the development of new projects?

Heat transfer technology

- Improved technology performance
 - System design support available
 - Synthetic heat transfer fluids designed for precise temperature control and superior product life
- Lower operational risk
 - Safety review conducted during a system's design phase
 - Fluids made to run smoother for longer, avoiding unnecessary downtime
- Support new projects/technologies
 - Ongoing support available from Eastman technical experts
 - Customized maintenance and safety training seminars to help companies keep their employees engaged and informed

Industry knowledge

Eastman heat transfer fluids have been around for more than 60 years and are featured in more than 15,000 systems worldwide, ensuring a broad base of institutional knowledge.

- Longer fluid life and optimized system maintenance enabled through our Total Lifecycle Care™ program, which includes sample analysis, training and support
- Access to new projects through our well-established market network

Market insights

- Emerging markets
- Competitive technology insights
- Customer unmet/underserved needs
- Regional differences in market attractiveness
- Access to large customer base as needed

Benefits

Time and cost savings: Streamline the design process and reduce trial and error by quickly identifying the right heat transfer system components and heat transfer fluid for your application.

Improved start-up: Minimize system failure risk and downtime by ensuring proper selection and compatibility of key components and heat transfer fluid.

Contact your Eastman account manager for more information or to set up an engineering seminar for your team.

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