

Subject: Risks Related to Out of Specification Aviation Turbine Fuels

Ref. Publications:

- Regulation (EU) [2018/1139](#) dated 04 July 2018.
- Commission Regulation (EU) No [1321/2014](#) dated 26 November 2014.
- Commission Regulation (EU) No [965/2012](#) dated 05 October 2012.
- Regulation (EU) [2023/2405](#) dated 18 October 2023.
- Commission Regulation (EU) No [139/2014](#) dated 12 February 2014.
- EASA Executive Director Decision [2014/012/R](#) dated 27 February 2014.
- EASA Certification Memorandum [CM-PFIS-009](#) Issue 01 dated 28 February 2013.
- ICAO Manual on Civil Aviation Jet Fuel Supply ([Doc 9977](#)) 1st Edition, 2012.
- ASTM International [ASTM D7566-24B](#) dated 27 August 2024.
- ASTM International [ASTM D1655-24D](#) dated 04 December 2024
- United Kingdom Ministry of Defence Defence Standard 91-091 Issue 18 dated 28 December 2024.
- Energy Institute / Joint Inspection Group (JIG) [EI/JIG 1530](#) Standard dated May 2019.
- Energy Institute [EI 1533](#) 2nd Edition dated February 2025.
- Joint Inspection Group [JIG 1](#) dated September 2021.
- Joint Inspection Group [JIG 2](#) dated September 2021.
- Joint Inspection Group [JIG 4](#) dated September 2021.

Applicability:

Aviation fuel suppliers and producers, aviation fuel blending facilities, organisations involved in storing and dispensing of fuel, National Competent Authorities (NCAs), aircraft operators, aerodrome operators, design approval holders.

Definitions:

Design approval holder: An entity that holds the approval for the design of an aeronautical product, part, or appliance, ensuring it meets regulatory compliance standards.

Synthetic blending components (SBC): Fuel blending components derived from non-conventional sources, as defined in ASTM D7566, DefStan 91-091, and EI standards. Under ReFuelEU Aviation, SBC is referred to as Sustainable Aviation Fuel (SAF).

Synthetic aviation turbine fuel (SATF): A blend of synthetic blending components (SBC) with fossil-based jet fuel conforming to ASTM D7566. In DefStan 91-091 and JIG standards (JIG 1, JIG 2, JIG 4), SATF is referred to as semi-synthetic jet fuel (SSJF).

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Synthetic: In aviation fuel quality standards, refers to fuels derived from any non-conventional source, without considering sustainability characteristics.

Description:

SAF market adoption

From January 2025, aviation fuel suppliers shall ensure that all the aviation fuel made available to aircraft operators at each European Union airport contains the minimum share of SAF (SBC of sustainable origin). These shares are set out in Annex I of Regulation (EU) 2023/2405 (ReFuelEU Aviation) and gradually increase over time, starting at 2% in 2025 and reaching 70% by 2050. Compliance is determined over an annual reporting period. For economic and logistic reasons, the market introduction will be realised in form of locally higher blending ratios (in accordance with respective requirement in ASTM D7566).

Applicable requirements related to aviation turbine fuels

At aircraft level, approved fuel specifications such as DefStan 91-091 and ASTM D1655 are contained in operating limitations listed in the relevant Type Certificate Data Sheet and Aircraft Flight Manual (AFM); more details are provided in EASA CM-PFIS-009. It is the responsibility of the aircraft operator to ensure that the fuel used for its operation is in accordance with the specifications and limitations listed in the AFM (Regulation 965/2012, Annex IV, CAT.OP.MPA.175, (b) (7)).

As provided in the definitions above, SAF as referred to in ReFuelEU Aviation means what is defined in fuel quality standards as an SBC. As specified in ASTM D7566 / DefStan 91-091, SBC must be blended with conventional turbine fuel into a SATF. Before blending, fuel producers and suppliers must ensure that the SBC conforms to the requirements outlined in the currently applicable Annexes A1–A8 of ASTM D7566, depending on the specific type of SBC used. The final blended fuel must comply with all requirements specified in Table 1 of ASTM D7566 at the point of batch certification and release. Additionally, the blending location is considered a point of batch origination and must conform to all standard requirements. DefStan 91-091 requires that blending shall be upstream of the airport fuel storage depot (only certified aviation turbine fuel is to be delivered to the airport), except in introductory phase where the volumes involved are small (e.g. no more than the capacity of one or two fuel trucks).

Furthermore, DefStan 91-091 requires traceability, which is defined as the ability to track distinct batches of fuel through the distribution system back to the original point of manufacture using the correct documentation. This requires batch volume and quality documentation with information on additive concentration, hydro-processed content, and synthetic components (if present) to be maintained in accordance with the minimum documentation requirements. At the point of manufacture, the SATF Certificate of Quality (CoQ) shall include a listing of the quality documents relating to the conventional and SBC batches in the blend and their respective volumes to show compliance with the blending limits set out in the Annexes to ASTM D7566. The SBC producer's CoQ, Certificate of Analysis or Recertification Test number shall be available for each SBC at the point of batch origination.

In accordance with ADR.OPS.B.055 on fuel quality and related AMC/GM of Regulation (EU) 139/2014, aerodrome operators are required to verify, if organisations involved in storing and

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dispensing of fuel to aircraft have procedures ensuring the provision of uncontaminated fuel with the correct specifications.

Potential risks

With the growing adoption of SATF, there is an increased potential of receiving fuel or SBC, which does not meet quality criteria described above, due to the novelty and complexity of SBC production, handling, and blending processes. The high prices of SBC, as compared to fossil jet fuel may attract fraudulent activities, further increasing the risk of out-of-specification fuel.

Out-of-specification fuel may impact aircraft performance and operational safety.

This SIB is published to raise awareness of the potential risks associated with SATF market expansion and to encourage proactive measures for fuel quality assurance all along the supply chain.

At this time, the safety concern described in this SIB is not considered to be an unsafe condition that would warrant Airworthiness Directive (AD) action under Commission Regulation (EU) [748/2012](#), Part 21.A.3B, nor Safety Directive under Commission Regulation (EU) [965/2012](#), Annex II, ARO.GEN.135 or Regulation (EU) [139/2014](#), Annex II, ADR.AR.A.040.

Recommendation(s):

EASA recommends that:

1. Fuel suppliers and fuel blending facilities:

- Conduct auditing of SATF/SBC suppliers, especially new entrants to the market.
- Strengthen quality control processes at point of fuel blending to ensure that all SBC and SATF meet the relevant fuel specifications (e.g. DefStan 91-091, ASTM D7566, ASTM D1655).
- Fuel quality certification of SBC and SATF should be conducted by independent laboratories that are fully equipped for SBC and SATF testing. Laboratories should comply with EI/JIG-1530 requirements and stay up to date with the latest standards and test methods.
- Ensure compliance to EI /JIG 1530 and EI 1533 quality assurance requirements for handling of SATF and SBC.
- Ensure compliance with EI/JIG 1530, EI 1533 and DefStan 91-091 in relation to requirement of blending to be performed outside of the aerodrome.
- Ensure compliance with DefStan 91-091 traceability requirements for SBC and SATF.
- Provide training on quality assurance for SATF and SBC to personnel involved in fuel handling, blending and management.

2. Design Approval Holders:

- Identify and assess safety hazards and mitigation of safety risks related to out-of-specification fuel during SATF market adoption.
- Raise awareness within aircraft operators and fuel suppliers about safety hazards and mitigation measures for out-of-specification fuels.
- Review aircraft maintenance instructions to evaluate the potential impact of out-of-specification fuel and incorporate any necessary maintenance tasks to identify or address contamination or compatibility issues with the aircraft.

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- Share fuel quality related findings with stakeholder groups to support industry awareness and mitigation development.

3. Aerodrome operators:

- Verify, in accordance with ADR.OPS.B.055 and related AMC/GM of Commission Regulation (EU) 139/2014, if organisations involved in the storage and dispensing of aviation fuel have procedures in place to ensure that uncontaminated fuel with the correct specifications is delivered, particularly with regard to effective quality assurance for SATF, for example in accordance with JIG1, JIG2, JIG 4 and EI 1533.
- Ensure that blending operations are not performed at aerodrome (in accordance with DefStan 91-091).
- Ensure that contracts with airport fuel storage operators include requirements to comply with JIG1, JIG2, JIG 4, EI/JIG 1530 and EI 1533 quality assurance standards.
- Raise awareness within organisations involved in storing and dispensing of aviation fuel (including ground handling organisations providing refuelling and defueling services) and aircraft operators regarding safety hazards, and mitigation of safety risks related to out-of-specification fuel.

4. Organisations involved in storing and dispensing of aviation fuel:

- Review and adapt procedures, ensuring that uncontaminated fuel of the correct specification is delivered to aerodrome fuel depots, to include quality assurance requirements for SATF, for example in accordance with JIG 1, JIG 2, JIG 4 and EI 1533.
- Ensure that staff is adequately qualified and trained, and is familiar with the most recent fuel quality assurance practices.
- Through the safety management system, identify the safety hazards, assess, and mitigate the safety risks associated with contaminated and out-of-specification fuel.

5. Aircraft operators:

- Aircraft operators, especially when directly contracting SATF or SBC producers, should conduct enhanced oversight of SATF and SBC suppliers, with a particular scrutiny of new entrants to the market.
- Ensure that contracts with fuel suppliers include requirements to comply with EI/JIG 1530 and EI 1533 quality assurance standards.

6. National Competent Authorities:

- Ensure that the aerodrome operator's safety management system includes effective quality assurance for SATF and SBC, for example via JIG 1, JIG 2, JIG 4 and EI 1533.
- Ensure that blending operations are not performed at aerodrome (in accordance with DefStan 91-091).
- Promote awareness and provide guidance to stakeholders on the management of risks associated with out-of-specification aviation turbine fuels.

Beyond the above, all stakeholders are reminded that any out-of-specification fuel occurrence shall be reported to NCAs and to EASA, as applicable, via [EU aviation safety reporting system](#).

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Contact(s):

For further information contact the EASA Safety Information Section, Certification Directorate.

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