

This bulletin is addressed to Into-plane operators who deliver JET-A1 with FSII to their customers using inline injection from truck mounted FSII reservoirs.

## Background:

The mishandling of Diesel Exhaust Fluid (DEF) is an emerging threat to flight safety due to recorded incidents of its mistaken addition to the FSII dispensing reservoirs on refuelling vehicles, resulting in the delivery of contaminated jet fuel to aircraft. DEF is a urea-based chemical which is added to the exhaust streams of diesel-powered engines to reduce NOx emissions from the exhaust gases. Where an operation handles both DEF and FSII there is a potential for cross contamination. This risk is increased where both fluids are added to reservoirs mounted on the same vehicle. If DEF is mixed with jet fuel it forms crystalline deposits called clathrates. These deposits may accumulate on filters, fuel metering components, fuel system components or engine fuel nozzles and have caused engine shut-downs. DEF is commonly known as AdBlue<sup>®</sup>, Bluetec<sup>®</sup> or H2blu<sup>®</sup>. FSII is often known as e.g. PRIST<sup>®</sup> or ICE-5<sup>®</sup>.

Typical FSII Injection system reservoir



Typical FSII Injection control panel



Typical truck mounted DEF reservoirs



## The case for action:

Cross contamination has led to flight safety incidents including where engine propulsion has been lost (dead stick):

**November 2017-USA:** FSII reservoir filled with DEF - 5 Aircraft emergency landings.

**August 2018-USA:** DEF mixed into FSII reservoir after repairs - 2 Aircraft emergency landings.

**May 2019-USA:** DEF mixed into FSII transfer container - 2 Aircraft emergency landings & 1 'dead stick' landing.

Further information can be found at: *Aircraft Diesel Fluid Contamination Working Group*

[https://download.aopa.org/advocacy/2019/2019\\_06\\_11\\_Aircraft\\_DEF\\_Contamination\\_Working\\_Group\\_Report\\_FINAL.pdf](https://download.aopa.org/advocacy/2019/2019_06_11_Aircraft_DEF_Contamination_Working_Group_Report_FINAL.pdf)

**Actions:** This bulletin introduces new requirements in the JIG Standards.

**1. Operators shall implement effective procedures for receipt, storage, transfer and stock recording of all FSII and DEF held on location, including:**

**Receipt documentation**

In order to support traceability and segregation, receipt documentation shall be checked to ensure that the product and documentation supplied match the FSII and DEF ordered, and that all relevant documents have been supplied.

**Container condition/labelling**

All containers received shall be checked for appropriate labelling and undamaged condition when received. If not present or suitable, appropriate labelling shall be applied at this stage.

**Recording of shipments and updating stock records**

Records of shipment details, quantities received, stock levels in storage, quantities of FSII and DEF transferred to vehicle reservoirs and stocks in vehicle reservoirs shall be maintained.

**Disposal of used containers**

When an FSII or DEF container is emptied, immediately move it to a separate used container area and mark it as empty with the original material signage marked with a large "X" (the signage should not be obliterated so container residual contents can be identified and disposed of via an approved hazardous waste process).

**2. Segregation, Storage and control of stocks**

There is currently no colour differentiation between FSII and DEF and no Industry agreed standard for selective coupling systems, therefore, operators shall implement the following controls to manage FSII and DEF.

- All FSII and DEF stocks shall be stored in separate and segregated storage areas.
- FSII and DEF storage areas shall be clearly labelled.
- Operators shall control replenishment of truck mounted FSII and DEF reservoirs using procedures which require a documented cross check and confirmation by a second person prior to refilling the reservoirs.

Additional physical controls to prevent cross contamination shall include one of the below;

1. Lockable filler caps on truck mounted FSII reservoirs with keys held under controlled conditions.
2. Transfer of FSII through a grade selective coupling/adaptor on the transfer hose and the permanently installed vehicle's FSII reservoir. These selective couplings/adaptors shall be unique for FSII transfer at each site.

### 3. Vehicle reservoir labelling

FSII and DEF reservoirs on fuelling vehicles and transfer containers if used, shall be clearly labelled. A warning sign shall also be applied next to the fill point, clearly naming the brand of the additive stored in the reservoir, e.g.

- For DEF reservoirs: “Warning! Reservoir for {Brand of DEF} only”
- For FSII reservoirs: “Warning! Reservoir for {Brand of FSII} only”

### 4. Procedures:

All requirements listed above shall be subject to appropriate Management of Change plans and reflected in written procedures for the receipt, storage, stock control, handling, transfer and dispensing of FSII and DEF. There shall be separate procedures for FSII and DEF.

### 5. Training

Provide clear training, instructions and procedures to all relevant staff including fuelling operators and vehicle mechanics on;

- the potential consequences and risks to flight safety of the mixing of DEF with jet fuel and its effects, and
- the correct storage, handling, dispensing and control of both FSII and DEF.

***Additional information can be found in E11538- Handling of Fuel System Icing Inhibitor and aviation fuel containing Fuel System Icing Inhibitor.***

### Actions to Implement this Bulletin (See Table 1 for Action Type Codes)

Action Description	Action Type	Completion Date
Implement effective procedures for receipt, storage, stock control, handling, transfer and dispensing of FSII and DEF held on location	JS	31 May 2020
Establish appropriate segregation and labelling of FSII and DEF stocks in storage and operational use.	JS	31 May 2020
Clearly label the FSII and DEF reservoirs on fuelling vehicles, transfer containers and hoses if used.	JS	31 May 2020
Implement physical controls to prevent cross contamination	JS	31 Oct 2020
Provide clear training, instructions and procedures to all relevant staff	RA	31 May 2020

Table 1 Action Type Codes

Action Types	JIG Bulletin Action Type Definition
JS	Change to JIG Standard – to be adopted by JV and/or Operator to continue to meet the JIG Standard(s) (JIG 1, 2, 4, EI/JIG 1530 and the JIG HSSE Management System).
RA	Required Action to implement one off verification or checks outlined in the table of actions.
RP	JIG Recommended Practice which the JV should consider adopting as its own practice (**).
I	Issued for information purposes only.
Note (**)- If the JV agreements require any of the JIG Standards and/or any of the JIG Common Processes as the governing operational standard then adoption of changes to applicable JIG Standards and/or Common Processes should not be considered optional by the JV Board.	

**Note:** This document is intended for the guidance of Members of JIG and companies affiliated with Members of JIG and does not preclude the use of any other operating procedures, equipment or inspection procedures. The information contained in this publication is subject to constant review in the light of changing government requirements and regulations. Although efforts are made to keep this information up-to-date, accurate, complete, and free from error, we make no representation, warranty or guarantee, whether express or implied, that the information is up-to-date, accurate, complete, free from error, or in compliance with applicable law and regulations. No subscriber or other reader should act based on any such information without referring to applicable laws and regulations and/or without taking appropriate professional advice. None of JIG, its Members, the Companies affiliated with its Members accepts responsibility for any loss or damage, whether in contract, tort (including negligence), breach of statutory duty, or otherwise, even if foreseeable, arising under or in connection with your use, adoption or reliance on the information in this document. You use this information at your own risk, but for the full terms and conditions concerning use of this document, please refer to <http://www.jigonline.com/legal-and-copyright/>

JIG is the owner of the copyright and all intellectual property rights in the publication.  
IATA uses such rights with permission from JIG.