



**U.S. Department
of Transportation
Federal Aviation
Administration**

SAFO

Safety Alert for Operators

SAFO 18015
DATE: 11/13/18

Flight Standards Service
Washington, DC

http://www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/safo

A SAFO contains important safety information and may include recommended action. SAFO content should be especially valuable to air carriers in meeting their statutory duty to provide service with the highest possible degree of safety in the public interest. Besides the specific action recommended in a SAFO, an alternative action may be as effective in addressing the safety issue named in the SAFO.

Subject: Jet Fuel Contaminated with Diesel Exhaust Fluid (DEF).

Purpose: This SAFO alerts and advises aircraft operators, Fixed Base Operators (FBO), Federal Aviation Administration (FAA)-certificated repair stations, Flight Standard District Offices (FSDO), and foreign civil aviation authorities that certain aircraft refueled with jet fuel contaminated with DEF or used in refueling equipment that was exposed to DEF.

Background: Between August 12 and August 16, 2018, five aircraft were identified as being serviced with jet fuel containing DEF at Miami-Opa Locka Executive Airport (OPF) located in Opa-locka, Florida. Also during the same time period, nine other aircraft were identified as being serviced using refueling equipment that had been exposed to DEF. An investigation revealed that Diesel exhaust fluid was inadvertently used instead of fuel system icing inhibitor (FSII) on a refueling truck at OPF and injected into the fuel with the truck's FSII injection system. This affected both the aircraft receiving the contaminated fuel and the aircraft that were serviced with the refueling equipment that had been exposed to DEF.

While a potential safety concern exists for aircraft serviced with jet fuel contaminated with DEF, at this time the airworthiness concern is not considered an unsafe condition that warrants an airworthiness directive (AD) action under Title 14 of the Code of Federal Aviation Regulations (14 CFR) part 39.

The recent event of DEF being introduced into aircraft fuel systems is not an isolated event. On December 26, 2017, the FAA published a Special Airworthiness Information Bulletin (SAIB): HQ-18-08R1, "Engine Fuel and Control – Operation with Contaminated Jet Fuel." This SAIB contained the same information as this SAFO along with information from a similar situation when, between November 18 and November 21, 2017, seven aircraft were serviced with jet fuel containing DEF at Eppley Air Field Airport (OMA) in Omaha, Nebraska. During the same time period, an additional six aircraft were serviced using refueling equipment that had been exposed to DEF. As in this most recent event, DEF was inadvertently used instead of FSII on two aircraft refueling trucks at OMA and injected into the fuel with each truck's FSII injection system.

To address the most recent event at OPF, the FAA issued SAIB HQ-18-28, dated September 13, 2018. This SAIB, along with others, can be downloaded or viewed online at:

<https://www.faa.gov/aircraft/safety/alerts/saib/>

Distributed by: Air Transportation Division

Discussion: DEF is a urea-based chemical that is not approved for use in jet fuel. When mixed with jet fuel, DEF will react with certain jet fuel chemical components to form crystalline deposits in the fuel system. These deposits will flow through the aircraft fuel system and may accumulate on filters, fuel metering components, other fuel system components, or engine fuel nozzles. The deposits may also settle in the fuel tanks or other areas of the aircraft fuel system where they may potentially become dislodged over time and accumulate downstream in the fuel system as described above.

Aircraft identified as having received the contaminated fuel have experienced clogged fuel filters and fuel nozzle deposits that led to service difficulties and unplanned diversions. Those aircraft serviced with the contaminated refueling equipment also were exposed to trace amounts of DEF from residual fuel in the refueling hoses and equipment. As of this writing, the FAA has not received any service difficulty reports from these aircraft.

The crystalline deposits are not soluble in fuel, so they cannot be removed by flushing the aircraft fuel system with jet fuel. Although the deposits are soluble in methanol and other polar solvents, use of these chemicals may have adverse consequences on aircraft and engine fuel system materials. Consequently, original equipment manufacturers (OEM) should be contacted to develop inspection techniques and corrective maintenance actions appropriate for each specific aircraft model type and its level of exposure.

Jet fuel that has been contaminated with DEF no longer meet the aviation fuel operating limitations of aircraft certificated to operate on Jet A fuel, and, therefore, cannot be used on those aircraft. Contaminated jet fuel that has been removed from affected aircraft should be discarded and not used on aircraft or any other vehicles in the future.

The FAA is monitoring the situation to determine if additional action is required and requests that any service difficulties or maintenance and inspection findings on DEF introduced into aircraft fuel systems be reported to the individuals listed below in support of this effort.

NOTE: According to the Paperwork Reduction Act, a federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act unless that collection of information displays a currently valid OMB Control Number. The OMB Control Number for this information collection is 2120-0731. Public reporting for this collection of information is estimated to be approximately 5 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, completing and reviewing the collection of information. All responses to this collection of information are voluntary. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to the FAA at: 800 Independence Ave. SW, Washington, DC 20591, Attn: Information Collection Clearance Officer, ASP-110.

Recommended Action: The FAA recommends that owners or operators of affect aircraft do the following:

1. Contact their aircraft, engine, and APU OEMs to determine the appropriate inspections and maintenance actions to remove urea-based crystalline deposits from the fuel system. This action

may include removing and replacing fuel system parts or components affected by exposure to these deposits.

2. Report to the FAA any service difficulties (including fuel filter bypass and clogging incidents), fuel system repairs, and fuel system inspection results related to the presence of these urea-based crystalline deposits.
3. Discard any jet fuel that has been removed from an affected aircraft because it is suspected of being contaminated with DEF. The contaminated fuel should not be used on aircraft or other vehicles.
4. Discuss with your local fueling providers how best to determine if any of their diesel-powered airport service vehicles require the use of DEF. Also discuss with them what procedures they have put in place to prevent and test for jet fuel contamination.

Contact: Questions or comments regarding this SAFO should be directed to Aircraft Evaluation Group, Eduard Stalzer at (781) 238-7523 or by email at 9-avs-afs-150@faa.gov.