

Prevention of Misfuelling

Compliance with this Bulletin is required at all locations performing overwing fuelling operations in accordance with JIG Standards. The precautions outlined below are applicable to locations that supply only Jet Fuel, or only Avgas, in addition to those locations which supply both grades.

This Bulletin is issued as an update to existing JIG requirements for overwing fuelling (JIG 1 - Into-Plane Fuelling Services, sections 3.1.8, 6.5.5 & Appendix A10 and JIG 4 - Smaller Airports, sections 7.1.6, 10.5.4 & Appendix A6) and is intended to reflect current industry best practice in the prevention of misfuelling incidents. Misfuelling is the term used to describe when the incorrect grade of fuel is delivered to an aircraft. A misfuelling could result in an aircraft engine failure and this could be catastrophic if it occurs during flight. It is essential that procedures are in place to prevent this possibility.

Similar Aircraft

Certain aircraft are particularly vulnerable to misfuelling as they are similar looking but have different fuel requirements. Some examples are:

Requires Avgas

Beechcraft Queen Air
Cessna 404 Titan
Mirage

looks like
looks like
looks like

Requires Jet Fuel

Beechcraft King Air
Cessna 441 Conquest
Piper Meridien

In some cases, manufacturers supply the same aircraft with either Avgas or Jet Fuel powered engines. One example is the Cirrus SR22-GTS, illustrated below with the two different engine types:



Cirrus – Jet Fuel



Cirrus - Avgas

Grade Confirmation Procedures for overwing fuelling

Fuelling personnel shall never make an assumption about the grade of fuel required.

Grade confirmation between the customer and into-plane service provider shall always take place.

Fuel Request: Misfuelling prevention begins with the fuel request process when the fuel grade and aircraft registration shall be clearly established, ensuring the vehicle with the correct grade of fuel is dispatched.

Before fuelling can commence the Fuelling Operator SHALL ensure that at least two (2) of the following three (3) controls are in place:

Control 1

The aircraft is marked with a fuel decal at each fill point that clearly and without doubt corresponds to the grade of fuel marked on the fuelling vehicle, trailer or fixed (kerbside) delivery equipment.

Control 2

The fuelling nozzle spout and the aircraft fuel tank orifice (fill point) correspond to the norm for the fuel grade, i.e. For Jet Fuel, a wide selective nozzle spout (with a major axis of at least 67 mm) and large aircraft orifice, and for Avgas, a small circular spout (49 mm external diameter or less) and a narrow aircraft orifice.

Control 3

A Fuel Grade Confirmation Form, completed, signed and dated by the aircraft pilot or agent, has been received by the Fuelling Operator.

If only ONE of controls 1, 2 and 3 is met the fuelling SHALL NOT proceed and the Fuelling Operator shall immediately inform their Fuelling Service Manager or Supervisor. An acceptable written explanation from the aircraft pilot or agent and fuelling service management verification in writing is required before the fuelling may proceed.

Post Delivery Fuel Grade Confirmation: Before leaving the aircraft at the completion of fuelling the Fuelling Operator shall make a final check of the accepted controls (2 out of 3) as shown above.

If an anomaly is discovered after completion of fuelling, the aircraft pilot and fuelling service supervisor shall be informed immediately.

Overwing Fuelling Nozzles (Control 2)

Overwing fuelling nozzles shall be grade marked and colour coded (black handle or body for Jet Fuel and red handle or body for Avgas). Nozzle spouts shall not be painted or coated.

- For Avgas fuelling, nozzle spouts with a maximum external diameter of 49mm, fitted with a dust cap, shall be used.
- For Jet Fuel overwing fuelling, a nozzle with a selective spout having a major axis of 67-70 mm shall be fitted.

Avgas



Jet Fuel



Jet Fuel Spouts

Not all Jet Fuel aircraft have fuelling orifices that are sufficiently large to accommodate the Jet Fuel spout. Where smaller sized spouts (non-selective) have to be used to dispense Jet Fuel, either from vehicles or kerbside dispensers, they shall be used under controlled conditions to ensure that they are replaced by the larger selective Jet Fuel spout immediately after use.

On vehicles, the nozzle stowage points shall be connected to the brake interlock system so that the vehicle can only be driven away when:

- The selective spout is attached to the overwing nozzle and stowed. The stowage device shall be designed so that only the Jet Fuel selective spout is able to disengage the interlock; and,
- if the non-selective spout is stowed on the vehicle, it is held in a designated stowage point which is connected to the interlock system.

Jet Fuel spouts should be protected from exposure to the weather by dust caps or by the interlock stowage, preferably in a closed cabinet. An example of suitable interlock stowage for a Jet Fuel selective spout is shown below:



Compression Ignition (e.g. diesel) Engines

Some aircraft types are equipped with engines that can be powered by either Jet Fuel or Diesel Fuel. These engines may be installed on aircraft that had previously been fitted with engines that used Aviation Gasoline (Avgas). These aircraft represent a serious risk of misfuelling by the delivery of Avgas to an engine designed for diesel fuel.

Unleaded (UL) Avgas

There is a growing number of aircraft which are equipped with engines capable of running on Unleaded (UL) Avgas. UL-91 is currently available in some areas but is not suitable for all types of piston engine aircraft. Misfuelling of UL-91 into an engine designed to run only on a higher octane fuel (e.g. Avgas 100LL) is of particular concern as it could have severe consequences.

Aviation Fuel Grades

Only aviation fuel grades (Jet Fuel and Aviation Gasoline) may be delivered to aircraft fuel systems (see Section 5.1 of JIG 1).

Although some aircraft engines are certified for use with Diesel Fuel or Motor Gasoline, **it is not permitted to fuel aircraft with Diesel Fuel or Motor Gasoline (Mogas).**

Fuel Grade Confirmation Form

This form shall be completed before each fuelling when one of the following applies:

(Tick the box which applies)

- ☐ a) The aircraft is **not marked** with a fuel grade decal which clearly and without doubt corresponds with the grade of fuel marked on the fuelling vehicle, trailer or fixed (kerbside) delivery equipment.
- ☐ b) The fuelling nozzle spout or the aircraft fuel tank orifice **do not** correspond to the norm for the particular fuel grade, i.e. for Jet Fuel, a wide selective nozzle spout and large aircraft orifice, and for Avgas, a small circular spout and narrow aircraft orifice.
- ☐ c) Overwing fuelling during air-shows

TO BE COMPLETED BY AIRLINE/AIRCRAFT AUTHORISED REPRESENTATIVE

To: (Into-plane service)

At: (Airport)

Aircraft Registration Number:

The aviation fuel requirements for this aircraft are as follows:

	FUEL GRADE (*)	QUANTITY
JET FUEL		
(Jet A-1 or Jet A)		
AVGAS		
(AVGAS 100LL)		

(*) Write either Jet A-1, Jet A or Avgas 100LL in the appropriate box

Note: Where unleaded Avgas (UL 91) is available, the fuel grade confirmation forms shall be modified to include Unleaded Avgas as a separate grade.

I confirm that the above fuel grade is suitable for use in the aircraft referred to above

Name Signature.....

Position Date..... Time.....

TO BE COMPLETED BY FUELLING OPERATOR IF JET FUEL WAS DELIVERED BY NON-SELECTIVE SPOUT

I confirm that the grade-selective spout was reattached to the nozzle after completion of fuelling

Name Signature.....

Unattended Overwing Fuelling Operations

The unattended (i.e. when the aircraft pilot or representative is not present) delivery of fuel overwing is discouraged. Where unattended fuelling is unavoidable then Control 1 (aircraft grade marking) and Control 2 (nozzle spout and aircraft orifice) described on page 2 of this bulletin shall both be satisfied before fuelling can commence. On completion of the fuelling the Fuelling Operator shall attach a colour-coded fuel tag to a suitable position on the aircraft, position to be agreed with the aircraft operator (see example tags below). The tag shall be visible to the pilot upon return to the aircraft and shall clearly state the fuel type, fuel grade and quantity of fuel delivered to the aircraft.

<p>IN ACCORDANCE TO YOUR INSTRUCTIONS AND THE FUEL GRADE LABEL ON THE AIRCRAFT, YOUR AIRCRAFT _____ HAS BEEN FUELLED WITH _____ LITRES OF</p>	<p>AIRCRAFT REG _____</p> <p>TIME _____</p> <p>RECEIPT NO _____</p> <p>FUELLED BY _____</p>
AVGAS	

<p>IN ACCORDANCE TO YOUR INSTRUCTIONS AND THE FUEL GRADE LABEL ON THE AIRCRAFT, YOUR AIRCRAFT _____ HAS BEEN FUELLED WITH _____ LITRES OF</p>	<p>AIRCRAFT REG _____</p> <p>TIME _____</p> <p>RECEIPT NO _____</p> <p>FUELLED BY _____</p>
JET A-1	

Self-Service Fuelling Operations

Self-Service Fuellings are fuelling operations performed by the customer without a representative of the fuelling service being present. The 2 out of 3 controls described on page 2 in this bulletin cannot be enforced for a number of reasons, including:

- The customer may require the use of a non-selective Jet Fuel spout for their aircraft and, for Avgas the size of the aircraft orifice is not checked.
- The control to verify that the grade labels on the aircraft match those on the fuelling unit can only be carried out by the customer.
- The control requiring the completion of a grade confirmation form cannot be fulfilled as the fuel supplier is not in attendance to check that the signature and form are correctly completed.

In view of the above, a different set of controls is required to manage the risks related to the delivery of the correct fuel grade for self-service fuelling. The requirement in such circumstances is that either (a) or (b) below is in place together with two of (c), (d) and (e).

- (a) Fuel grade dedicated customer fuelling card, achieved by either having the grade coded into the magnetic strip of the fuelling card (checked by the card reading payment terminal software thus preventing the wrong grade selection), or the grade checked at the payment terminal (via the internet) against the customer account details. For payment by credit card this check would be made via the PIN verification and system check on the credit card.
- (b) At the payment terminal the pilot/customer is asked by the system to select the grade of fuel required, followed by a second question to confirm the grade selected.
- (c) A fuelling card is used with the fuel grade written on the front of the card.
- (d) A large sign is displayed at the self-service unit showing a large EI grade identification decal(s) along with a clear set of instructions for use of the self-service unit with emphasis on the requirements for selecting the fuel grade.
- (e) A warning to the customer explaining the risks of incorrect fuel grade delivery. This may be by means of a flyer/letter sent to the customer when issuing the fuel card or invoice, or a fixed sign (based on the flyer/letter) at an obvious location near the self-service unit. For credit card payments the latter requirement in (e), of a sign, shall be applied.

All locations shall have emergency protocols in place for operating the pump when the outside card reading payment terminal fails.

Additional Precautions to Prevent Misfuelling Incidents

Misfuelling incidents occur infrequently. However, the need for effective preventative measures is due to:

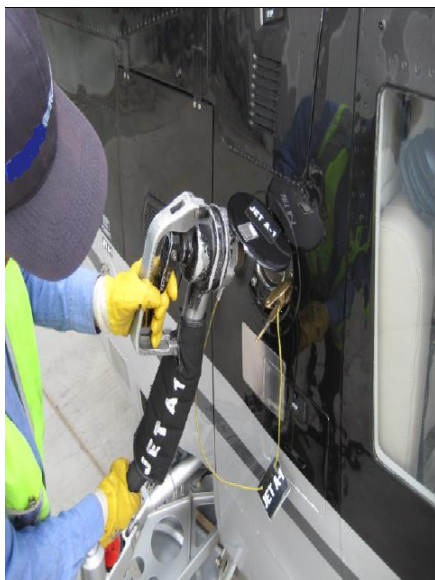
- (1) the potential consequences of supplying the wrong grade of fuel,
- (2) the lack of a grade selective delivery nozzle that can always be used, and
- (3) additional concerns related to fuelling aircraft with compression ignition (diesel) engines including those aircraft which have been converted from Avgas to Diesel engines

Some additional measures, recommended to enforce the procedures for grade confirmation are outlined below.

Colour coded handles or bodies (black for Jet Fuel and red for Avgas) on overwing nozzles (see photo on page 3)

Fuelling equipment to be clearly grade marked using decals that are prominently displayed and are clearly visible.

Coloured grade decal sleeves on overwing delivery hoses and coloured grade decal tags on overwing nozzle bonding cables



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

Action Description	Action Type
Managers of Into-plane Operations shall ensure that Fuelling Operators are made aware of the content of this Bulletin as soon as possible and no later than the end of October 2015.	JS
Managers shall ensure that fuelling procedures at their locations are updated to meet this requirement before the end of December 2015.	JS

Table 1 - Bulletin Action Types (Bulletins do not necessarily contain all Action Types)

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) (**).
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.	

This document is intended for the guidance of Members of the Joint Inspection Group (JIG) and companies affiliated with Members of JIG, and does not preclude the use of any other operating procedures, equipment or inspection procedures. Neither JIG, its Members, the companies affiliated with its Members nor the International Air Transport Association (IATA) accepts responsibility for the adoption of this document or compliance with this document. Any party using this document in any way shall do so at its own risk.