

# Aviation Drummed Product Guide



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## **FOREWARD**

The purpose of this publication is to provide you, the pilot or operator, with recommended procedures to be able to safely decant fuel from drums into storage or directly into your aircraft.

Quality control procedures are included that will ensure that the fuel that is pumped into your aircraft is of the highest standard. We have also included product information and material safety data sheet links that will provide you with information about the characteristics of the fuel that you will be handling and what precautions you should take. The health hazards of the fuel are explained and first aid requirements, if necessary, are covered.

We trust that you will take time to read the contents of this booklet as it will promote safety and enhance your own occupational hygiene standards.

BP strives to be an industry leader in health and safety precautions and this booklet is a part of our campaign to improve Health, Safety and Environmental standards.



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## **1. AVOID AIRCRAFT MISFUELLING**

Every year around the world a number of aircraft are refuelled with the incorrect grade of fuel. Fortunately, this error is usually detected before the aircraft takes off but, sadly, this is not always the case. We continue to see reports of incidents and even aircraft crashes resulting from misfuelling.

### **Jet fuel into Avgas Piston Engine powered aircraft:**

If an Avgas powered aircraft is advertently refuelled with Jet Fuel, there can be sufficient Avgas remaining in the aircraft's fuel lines and carburettors to enable the aircraft to taxi and even take off. When the Jet Fuel reaches the engine, often at a critical time during the take off, the engine can fail and cause a forced landing or worse – the aircraft may crash.

### **Avgas into Turbine Engine (Jet fuel) powered aircraft:**

A similar situation may occur if Avgas is put into an aircraft which should have been refuelled with Jet Fuel. Aircraft range will be reduced and the different combustion characteristics could lead to aircraft damage. It may be possible to fly a turbine powered aircraft on Avgas under certain conditions and with the manufacturer's approval however these factors cannot be taken into account if the pilot is unaware before take off.

### **Avgas into diesel cycle (Jet fuel) Piston Engine aircraft:**

In recent years, the risk of misfuelling has become more complex with the introduction of diesel cycle (Jet fuel) piston engine aircraft. Using aviation gasoline (Avgas) in a diesel engine aircraft rather than Jet fuel can result in serious consequences.

Therefore, Air BP recommends the following to avoid aircraft misfuelling from aviation drums:

#### **1.1 Grade Segregation**

- 1.1.1 Where more than one grade of fuel is used and / or stored at a site there should be grade segregation of the drums.
- 1.1.2 Drums containing different grades of fuel shall be clearly separated for storage to minimize the risk of refuelling error.
- 1.1.3 Drum batches should always be used up in order.

#### **1.2 Fuel Grade Labels**

- 1.2.1 It is recommended that aircraft be fitted with Fuel Grade Warning Labels (refer to appendix 1) adjacent to the overwing refuelling ports of your aircraft.
- 1.2.2 These labels provide the best warning to operators of grade of fuel your aircraft requires every time it is refuelled.



1.2.3 Air BP applies a NO DECAL – NO REFUEL policy.

**1.3 Selective Fuel Orifice**

1.3.1 Selective fuel orifices should be fitted to avgas powered aircraft overwing fuelling ports to reduce the diameter and thus create a grade selective fuel port.

1.3.2 It remains our firm belief that the selective fuel port and nozzle spout system is the most effective protective measure available to combat misfuellings.



## 2. DRUM STORAGE

There are specified requirements concerning the storage of 200L drums in domestic and commercial premises. Please refer to Australian Standard AS1940 (latest issues) on detailed requirements regarding drum storage.

Drums should be stored in a suitable safe location which is well ventilated, away from any source of ignition and stored in such a manner that any product leakage will not damaged the environment or pose a risk to people. Whenever possible, the use of well-ventilated buildings is recommended for drum storage.

Drums may be stored upright (typically on pallets) provided that they are stored under cover, or stored with drum top covers. Where this is not the case drums shall be stored on their sides with bungs below the liquid level. The bottom drums shall be held in position (e.g. by wedges) to prevent collapse of stacks. A single layer is strongly recommended.

Consignments shall be stored in separate batches to facilitate periodic inspection, and issued in rotation according to filling date. The earliest filling date shall be used first.

Drums shall be inspected weekly for leakage after filling.

Markings shall be checked and renewed as necessary to maintain clear identity of product and batch details.

Batches remaining in stock twelve (12) months after the filling date and at six (6) monthly intervals thereafter, shall be sampled and subject to periodic certification testing.

Drums are heavy objects and safe manual handling techniques utilising effective mechanical assistance should be employed at all times. Recommended tools:

- (a) Drum bung spanner (with tab seal remover)
- (b) Drum tilting lever
- (c) Drum trolley



### **3. QUALITY CONTROL OF DRUM STOCK**

#### **3.1 Drum checks**

- 3.1.1 Before decanting or delivery, the seals shall be checked to ensure they are intact and the correct grade is being used and that the batch is still current.
- 3.1.2 Expired batches should not be used until they have been tested to confirm they still meet specification requirements.
- 3.1.3 Ensure that the grade of fuel is correct for the aircraft type.

#### **3.2 Product checks**

- 3.2.1 Before decanting or delivery, it is recommended that a sample be taken from the drum and checked for visual signs of water or particulates and any other anomalies.
- 3.2.2 It is recommended that these checks be done on a bottom sample taken from the lowest point of the drum when it is placed on a tilt and after the drum has been allowed to settle for at least 10 minutes.
- 3.2.3 It is important to ensure that all sampling equipment is clean and there is no possibility of introducing contamination into the product.
- 3.2.4 If excessive quantities of water or particulates are found, or if the product is an unusual colour, the drum should be quarantined and should not be released or used for fuelling of aircraft.



#### 4. DELIVERY OF PRODUCT

Provided the quality control checks described have been satisfactorily completed, aviation fuels may then be delivered from drums.

##### 4.1 Decanting

4.1.1 When the drum is decanted into storage or into a fuelling vehicle then the following is recommended:

- i. In order to reduce the possibility of electrostatic discharges, drums, pumping equipment and storage tanks, fuelling vehicle tanks or aircraft must be electrically bonded together throughout the decanting operations.
- ii. Transfer should be via a suitable pump and preferably through micron filtration.
- iii. Bungs should be replaced tightly after decanting to prevent entry of dirt or water.

4.1.2 Keep the handling area tidy. Do not allow drums to accumulate near the pump unit. Drums required for decanting should be brought to and removed from the decanting area as expeditiously as possible. Decanting operation should proceed in orderly fashion with safety distances at least 15m between the batch of drums waiting to be decanted, the decanting area and empty drums.

##### 4.2 Direct delivery to aircraft

4.2.1 The drum should be bonded to the aircraft. The order of bonding should be pump to drum, then pump to aircraft.

4.2.2 Transfer is recommended to be via a filter monitor meeting the latest issue of Institute of Petroleum filter monitor specifications.

4.2.3 The following additional requirements apply if fuel is decanted directly into aircraft:

**i. Always check that the grade of fuel is correct for the aircraft prior to start of refuelling. Compare the grade of fuel indicated on the drum with the grade of fuel indicated on the aircraft grade decal and the refuelling equipment. It is vital that this 3 way cross check is done before opening the drum.**

ii. The drum suction lance used for decanting must be scrupulously clean internally and externally.

iii. Check the condition of the fuelling nozzle strainer before the first





fuelling of the day. Clean or replace it as necessary.

- iv. Drain the filter bowl to remove any sediment before the first fuelling of the day.
- v. Draw a minimum sample of 1 litre through the decanting equipment into a clear, clean glass jar and check it for water, dirt and the correct grade.
- vi. Make contact between the nozzle and the aircraft skin before the filter cap is opened. Maintain metal to metal contact between the nozzle and aircraft throughout delivery. (Where equipment is capable of delivery at flow rates greater than 100 litres/min, the nozzle should have a bonding cable attached and be bonded to the aircraft before fuelling starts. Where this is not possible the flow rate should be restricted to 100 litres/min. For Jet A-1 containing dissipator additive the limit is 200 litres/min).

4.2.4 Always replace dust caps on decanting equipment and replace drum bungs tightly after use to prevent the entry of dirt and water.



## **5. USE OF OPENED DRUMS**

The use of already opened aviation drums is not recommended by Air BP. However, where a partially full drum is left after a delivery and it is not possible to downgrade the fuel to non-aviation use, the drum should be resealed with the original bungs (without tri-sure cap) and marked "Opened - date". It should be stored so that the fuel level covers the bungs. It should be used at first subsequent fuelling and checked carefully for the presence of water before use.



## **6. AIR BP PRODUCT INFORMATION AND MATERIAL SAFETY DATA SHEETS**

### **6.1 Jet A-1**

- 6.1.1 Aviation turbine fuels (jet fuels) are manufactured predominantly from straight run kerosene's which normally require further treatment to meet the specification requirements. At some refineries there is an increasing tendency to incorporate proportions of product produced by hydrocracking processes.
- 6.1.2 The AFQRJOS checklist for Jet A-1, a kerosene fuel having a maximum freezing point of  $-47\text{ }^{\circ}\text{C}$ , forms the basis of international supply of virtually all commercial aviation world-wide.
- 6.1.3 BP Jet A-1 is a petroleum distillate blended from kerosene fractions having a freezing point below  $-47\text{ }^{\circ}\text{C}$  and a flash point above  $38\text{ }^{\circ}\text{C}$ . It usually contains a static dissipator additive.

### **6.2 Avgas**

- 6.2.1 Aviation gasoline is a complex mixture of relatively volatile hydrocarbons. The higher performance grades are produced by blending specially manufactured high octane petroleum fractions consisting of paraffins and light aromatic compounds. Aviation gasoline grades are identified in specifications by their minimum anti-knock engine ratings. The use of incorrect grade can have disastrous results in terms of engine performance and aircraft safety. In order to differentiate between grades, dyes are added to the fuels in accordance with an internationally agreed colour code to impart a distinctive colour.
- 6.2.2 In general, each type of engine is certified to operate on a specific grade of fuel and at one time several grades covering a range of anti-knock ratings were produced to meet the requirements of all the different types of engine. In recent years the diminishing demand for aviation gasoline has led to reduction in the number of grades available. With fewer fuel grades, manufacturing, storage and handling costs are reduced with subsequent benefits to consumers. Avgas 100LL is now the most widely available grade having replaced Avgas 80 and Avgas 100 in most areas of the world. However, Avgas 100 is still supplied by Air BP in Australia and New Zealand.

### **6.3 Material Safety Data Sheets**

- 6.3.1 Material safety data sheets (MSDS) should always be available and easily accessible wherever aviation fuel is stored and / or used.



6.3.2 MSDS's for Jet A-1 and Avgas manufactured and sold by Air BP in ANZ can be obtained from the following website:

[www.bp.com/airbp](http://www.bp.com/airbp)

**7. APPENDIX 1**

**7.1 Decal 'Avgas only'**

- 7.1.1 To be used on aircraft fitted with engines approved to use aviation gasoline with no grade identification displayed.



**7.2 Decal 'Avgas 100LL'**

- 7.2.1 To be used on aircraft fitted with engines approved to use aviation gasoline, grade 100LL.



### 7.3 Decal 'Jet fuel only'

7.3.1 To be used on aircraft fitted with engines approved to use jet fuel.



For more information please contact the **Air BP Customer Service** on  
**1800 024 727 (Australia) or 0800 666 333 (New Zealand).**

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