

**NZAAA CODE OF
PRACTICE
FOR
FUEL STORAGE
AND HANDLING**

FORWARD

The purpose of this code is to detail the way in which aerial applicators will handle their fuel in order to comply with current legislation and to detail safe practices in order that loss or injury is minimised in this aspect of agricultural aviation.

In terms of the Resource Management Act mobile tankers (e.g. aircraft loaders) are considered to be fuel transporters.

This code deals with five common types of fuel storage and handling situations. They are:

- 1) Drums
- 2) Jerrycans
- 3) Mobile Tankers
- 4) Underground Tanks
- 5) Above Ground Tanks

The principles laid out in this code do not replace, repeal or override any laws, contractual common or otherwise that may be in force, nor do they prejudice any other remedies available to any party at common law.

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1. DRUMS

1.1 GENERAL

- a) Drums shall be stored on their sides.
- b) Drums shall be stored full. To avoid condensation, fuel is not to be stored in part full drums.
- c) Fuel drums shall be dated on arrival from the Fuel Company Depot. Storage periods shall not exceed six months for Avgas or twelve months for Jet A1.
- d) Jet A1 shall not to be stored in Avgas drums or vice versa.

1.2 TRANSPORTING

- a) To prevent accident drums shall be firmly secured to the vehicle which is transporting them.
- b) It is acceptable to transport drums in the upright position provided there is no likelihood of rain water or any other contaminant entering the drum. Experience shows that it is sometimes possible for water to enter a sealed drum. In the event that any contaminant might settle on the top of drums a plastic cover should be fitted to each drum. Alternatively the drums should be transported on their sides. If a drum is inadvertently left outside upright in the rain, a top lip free from water should alert the operator that the water which should have collected in the top lip is now inside the drum.
- c) Care should be taken to ensure that the drums are not damaged as when this occurs, it is possible for the lacquer lining of the drum to be damaged and peel off and contaminate the fuel.

1.3 DRUM PUMPS

Pumps used to refuel aircraft shall be fitted with a filter or if this condition is not met, then all drummed fuel must pass through a chamois leather filter before entering the aircraft.

1.4 REFUELLING FROM DRUMS

- a) Prior to refuelling an aircraft from a drum the following procedure shall be followed:
 - (i) Fit pump to drum and lean drum over so that the pump is on the lowest side.
 - (ii) Pump a sample into a clean glass jar and inspect in accordance with Section 3.2.1 of this code.
 - (iii) If the sample is clean refuelling may commence.
 - (iv) If the sample is not clean resampling shall continue until a clean sample is obtained. In the event that a clean sample is still not obtained then the drum is to be rejected.
- b) Lean the drum so that the pump is on the high side during refuelling
- c) Whilst the aircraft is being refuelled the drum shall not be left unattended.
- d) At completion of refuelling the pump filter shall be closely inspected for the presence of contaminants. If any are found the fuel must be allowed to settle in the aircraft fuel tank for at least 10 minutes and then a sample drawn from the tank low point drains. This sample shall be inspected and if any contaminant is present, further samples shall be taken until a clean sample is achieved.

2. JERRYCANS

2.1 GENERAL

In agricultural operations the use of jerrycans to refuel aircraft is a practice which has been established for many years and this code does not seek to change that. There are many circumstances, particularly in helicopter operations, where the use of jerrycans is the only practical way to effect refuelling in remote areas. This section details how jerrycans are used to refuel an aircraft in a safe manner.

- a) In all cases jerrycans used for refuelling shall be marked with the grade of fuel they are filled with. Where operators use jerrycans to refuel with both Avgas and Jet fuel, different coloured jerrycans should be used for each type. e.g. white for Avgas and grey for Jet fuel. Nevertheless, jerrycans used for this purpose shall be marked with permanent pen or similar with the words either "Avgas" or "Jet A1." Avgas shall not be pumped into Jet A1 containers and Jet A1 shall not be pumped into Avgas containers.
- b) The cans are to be kept clean and the lids firmly tightened.
- c) The plastic gaskets under jerrycan lids should be removed to prevent them accidentally entering the aircraft fuel system.

2.2 REFUELLING FROM JERRYCANS

- a) Prior to refuelling an aircraft from a jerrycan the grade of fuel shall be checked visually.
- b) The jerrycan fuel can then be poured into the aircraft using a screw on filler if the configuration of the jerrycan and aircraft tank orifice dictates that fuel will be spilt otherwise. The jerrycan should be held in such a way that not all its contents can be emptied. Experience shows that if the jerrycan has a small amount of fuel remaining after refuelling, most if not all of any water present in the can will be collected in this low point.
- c) The person refuelling shall look in the jerrycan after refuelling to determine if any water or other contaminants are present in the trapped fuel remaining. If contaminants are present the aircraft shall be left to stand for at least 10 minutes then the tank low point drained until the sample is clear.
- d) Hot refuelling for aircraft types using Jet fuel is permitted provided the operator holds a hot refuelling dispensation. Hot refuelling with Avgas should not be carried out.

2.3 REFILLING JERRYCANS

- a) Water and other contaminants, if present, are easily seen in the fuel remaining once the jerrycan has been emptied. Any contaminants are to be flushed out prior to refilling the can with the flushings being stored in separate containers of a different type for later use for something other than aircraft fuel.
- b) Jerrycans shall not be filled to the extent that no air gap is left. The air gap must be of sufficient volume to allow the fuel to expand without splitting the jerrycan.
- c) Secure the lids firmly.

2.4 STORAGE

Operators should note that aircraft fuel can be stored in a building in jerrycans provided that the required danger and no smoking signs are displayed outside the building. It is further recommended that operators seek permission from their respective insurance companies before initiating this practice. Failure to disclose the presence of stored fuel would normally invalidate the operators insurance cover in the event of a fire.

3. MOBILE TANKERS

3.1 GENERAL CONDITIONS OF USE

- a) All mobile tankers shall have either a Certificate of Fitness or Warrant of Fitness (which ever applies) prior to being used on the road as a mobile tanker.
- b) Safety equipment requirements shall be met. These are:

	<i>Type</i>	<i>Tank Capacity</i>	<i>Extinguisher Size</i>
Fire Extinguishers	Dry Powder or Halon	Up to 2000 l	2.25 kg
		Over 2000 l	8.0 kg

Fire extinguishers shall be carried aboard mobile tankers at all times and must be readily available for use. Additionally, evidence of an annual check on each fire extinguisher shall be available.

A truck pack spill response kit shall be carried on the tanker at all times. These are available from:

Process Lubricants Limited,
P.O. Box 100-552,
North Shore Mail Centre,
Auckland
Phone 09 444 5444
Fax 09 444 1166

When the mobile tanker is also being used as an agricultural aircraft loader it shall have an axe readily available.

- c) The mobile tanker shall be labelled conspicuously as follows:
- Danger Flammable Liquid
No Source of Ignition within 8 metres.
- d) Any mobile tanker constructed after May 1997 shall be built in accordance with The Flammable Liquids Tankwagon Code which is available from the oil companies.
- e) Persons detailed to drive mobile tankers shall hold a Hazardous Substance endorsement on their drivers licence.
- f) Mobile tankers used for the storage of Jet A1 shall have to inside of the tank inspected for algae growth every two years.
- g) Filters on mobile tankers shall be inspected for serviceability every six months and replaced every two years or sooner if contaminants are found during inspection.

3.2 REFUELLING FROM MOBILE TANKERS

The following procedure shall be followed when refuelling from mobile tankers.

- * Park aircraft a safe distance from the tanker
- * Apply aircraft brakes and shut down engine if the aircraft operates on Avgas. Aircraft operating on Jet A1 may be left running provided CAA have issued a dispensation to the operator for hot refuelling.
- * Collect sample from tank sump and inspect.
- * Confirm correct grade of fuel.
- * Bond tanker to aircraft using the bonding reel.

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- * Engage pump
- * Draw sample from tank and perform quality check. (The sample shall be taken under pressure)
- * Draw sample from nozzle and perform quality check.
- * If pump flow rate delivery exceeds 200 litres per minute for Jet fuel or 100 l/min for Avgas connect nozzle bonding clip to aircraft refuelling orifice.
- * Refuel aircraft.
- * Remove nozzle, close filler cap, remove nozzle bonding, stow hose.
- * Disconnect bonding clip and rewind cable
- * Switch pump off.

3.2.1 VISUAL INSPECTION OF FUEL SAMPLES

The purpose of this section is to describe how to check the grade, cleanliness and confirm the absence of free or suspended water in the fuel.

- a) Check the sampling jar for traces of dirt or water and if necessary, wipe clean with a dry lintless cloth. Synthetic fibre cloths should not be used.
- b) Draw a sample. This should be done under pressure so that maximum “scouring action” from product flow is achieved. Sufficient volume must be drawn to ensure that a representative sample is obtained.
- c) Check the sample. Confirm the grade by identifying the colour. Inspect the sample for free water, suspended water and dirt particles. Free water will appear as droplets or a layer on the bottom of the sample container. Suspended water, normally only appearing in Jet fuel, produces a hazy or milky appearance to the fuel. A sample of any grade of fuel that does not contain any dirt or water will appear as “clear” meaning that there is no particulate matter or sediment in the fuel and “bright” meaning that the fuel “sparkles” in bright light, having no cloudiness or haze.
- d) Repeat sampling. If dirt or water are found sampling procedure shall be repeated until a clear and bright sample is obtained, if necessary flushing a quantity of fuel into a separate container between drawing samples. If a clean bright sample cannot be obtained, the tanker shall not be used. A fuel company or a fuel company contractor should be engaged to clean the tanker.

3.2.2 USE OF SYRINGE AND CAPSULE WATER DETECTORS

This section describes how to test Jet fuel for suspended water.

- a) Check that the syringe operates freely and that the capsules are within the expiry date marked on the bottom of the capsule tube.
- b) Fit the capsule. Remove one capsule from the tube, handle carefully, do not touch or allow any moisture on the yellow paper of the capsule. Close the tube immediately. With the piston of the syringe fully home, fit the capsule firmly on the syringe’s nozzle. Examine the capsule to ensure it is a uniform yellow colour. If not discard and fit another.
- c) Draw a sample into jar in accordance with Section 3.2.1 and immerse capsule in the fuel sample and withdraw piston slowly until fuel reaches the 5 ml mark.
- d) Read result by examining the capsule for any change of colour between the centre wetted area and the outer annulus. No colour change means no suspended water. The centre area of the capsule begins to turn green at suspended water concentrations of approximately 10 parts per million (ppm) and will be distinctly green at a concentration of 30 ppm. A few green speckles or a slight change of colour indicates a trace whilst a distinct colour change indicates suspended water and the fuel should not be

used.

- e) After sampling dispose of capsule safely, it can only be used once.

3.3 LOADING A MOBILE TANKER

This section details how to safely load a mobile tanker from a fixed refuelling facility.

- a) Check that the tanker is correctly positioned, its engine switched off, gears disengaged and parking brake applied.
- b) Check that the tanker is to be refuelled with the correct grade of fuel and exercise caution at locations where Jet fuel and Avgas are dispensed from adjacent pumps.
- c) Bond the pump to the tanker. Note that painted metal surfaces do not provide electrical continuity.
- d) Refuel tanker taking care not to fill beyond the level of ullage which has been established and from which expansion will not allow the tank to vent fuel.
- e) When filling is completed stow filling hose and disconnect bonding line and stow.
- f) Quality control checking shall take place by allowing the fuel to settle for at least 10 minutes and then take a minimum 2 litre sample from the tank low point drain. Visually examine the sample for contaminants and perform the syringe and capsule water detection test for Jet fuel.

A qualified person shall remain in attendance throughout the loading operation.

4. UNDERGROUND TANKS

Underground tanks are in most cases owned by the oil company that supplies the fuel. These companies have an arrangement with a maintenance contractor to check the entire installation in accordance with a maintenance programme. The owner is responsible for meeting the requirements of local legislation.

Provided the tank is owned by an oil company, the operator responsibility in regard to these installations is restricted to the following;

- a) A daily check for contaminants at the filter low point.
- b) A daily check to ensure that all locks are in place and the tank and pump installation is secure.
- c) A regular check on the fuel level to ensure adequate supply.

Operators should note that some of the oil companies are trying to persuade operators to buy the underground tank at their location. Irrespective of the price sought, operators should consider their decision to buy very carefully as ownership of the installation infers responsibility for any penalty for a leak should one occur.

If ownership or lease of a tank is considered, the precise conditions of the Resource Consent or other authority which authorises the positioning, maintenance, and inspection of the tank should be examined in detail, and current and on-going legal liabilities clearly established.

5. ABOVE GROUND TANKS

Since the implementation of the Resource Management Act these tanks are becoming more prevalent as they offer the owner the opportunity to immediately locate and repair any leak should one occur.

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Broadly speaking the rules that apply to these tanks are the same as those for underground tanks in 4 above. The most significant exception however, is that the RMA requires the overhead tanks to be banded to contain any spill should one occur.