

# **Filling 55-Gallon Fuel Drums, McMurdo Station**

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*OP-M-932*

*Revision 0*

*Approved by* [REDACTED]

*Posting Date 2/1/05*

*Active Divisions/Departments  
Fuels*

*Raytheon Polar Services Company*

*McMurdo Area Directorate*

*Contract No. OPP 0000373*

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## **Purpose**

This document describes the correct procedure for filling fuel drums at McMurdo Station.

## **Scope/Applicability**

This procedure applies to any Fuels Department personnel or other people stationed at McMurdo Station who may be required to fill fuel drums. These procedures should be followed each time drums are filled.

## **Terms and Definitions**

### **Absorbent**

Material used to soak up spilled fuel.

### **Air Force Pallet**

Large (88" x 108") aluminum-skinned platform issued by Cargo on which all Flying Drum orders must be placed. A full-sized air force pallet (type 463L) can hold up to 12 drums. A smaller Air Force pallet, called a "speed pallet", can hold from one to six drums.

### **Alpha Valve**

The primary service (supply) valve on any main fuel supply tank

### **AN-8**

Aviation fuel useable in diesel engines.

### **Aviation Drum**

A dent-free, rust-free, water-free, debris-free drum that will be filled with AN-8 and flown on an aircraft.

### **Bonding Cable and Clip**

A metal cable connected to an alligator type clip, used to dissipate static electricity.

### **Bung**

The threaded openings on the top of a drum used for filling, discharging and ventilation. There is one large and one small bung on each drum.

**Bung Cap**

Removable plug that threads into the bung.

**Bung Wrench**

A handy tool for opening and tightly closing bung caps.

**Chines**

The protruding rings circling the top and bottom of a drum, as well as two on the body.

**Dip Tape**

A reel-mounted, steel, measuring tape, usually 30 feet in length, with a weighted bob at the end. used to measure liquid level in a storage tank. In use, the bob is lowered to the bottom of the tank, and then withdrawn. Fuel level is determined by the checking the residual liquid “wet line” on the tape.

**Drum Order Tracking Sheet**

An informational aide to make sure the drums get properly filled and delivered.

**Drums**

Metal containers (normally of 55 gallon capacity) for storing and transporting fluids.

**Dunnage**

Material (generally 4”x4” wood blocks) placed under an aircraft pallet to provide clearance for handling with a forklift.

**Flying Drums**

Completely dent-free drum that will be flown on an aircraft.

**Gasboy**

Gasoline and Diesel fuel-dispensing pumps located adjacent to McMurdo bulk-fuel-storage tank D-2.

**Haz Waste Return Labels**

Small, red tracking tags to be filled out, rolled up and attached to the bung cap of every drum.

**Heliport**

An area designated for safe landing and take-off operations of rotary-wing aircraft (helicopters).

**Heliport Sump**

A spill-containment area, within which AN-8 drums are filled, at the Heliport.

**Herman Nelson**

A trailer-mounted space heater that burns gasoline.

**Milvan**

A large metal cargo shipping container, issued by Waste. When full, a milvan holds 90 drums.

**Mogas**

Gasoline used for Ford fleet, Herman Nelsons and small equipment.

**Mogas Sump**

The grate-covered, spill-containment area (near the Gasboy) where Mogas and Premix drums are filled.

**Nozzle**

A hand-held fitting with adjustable flow, used for filling drums.

**Premix**

Gasoline *with oil added*, used for equipment with two-cycle engines, such as snowmobiles and small equipment.

**Start Dip**

An initial measure of the amount of fuel in a storage tank. (See "Dip Tape".)

**Wooden Pallet**

A small, wood-framed platform available in various sizes, used for smaller drum orders that will not be flown in fixed wing aircraft. Drum orders to be flown by helicopters should be filled on wooden pallets.

## **Responsibilities**

**Fuels Operator**

The Fuels Operators hold primary responsibility for drum filling at McMurdo Station. They are given a Drum Order Tracking Sheet and meet a fuel order accordingly.

**Fuels Control**

Fuels Control is responsible for receiving drum requests, giving Drum Order Tracking Sheets to Fuels Operators, ordering pallets and verifying delivery of completed drum orders. This person also records details of gallons issued for drum orders and contacts the appropriate people to let them know the drum order has been completed.

## **Discussion**

### **Safety**

Always wear appropriate Personal Protective Equipment when filling drums. Eye protection, in the form of a full-face shield or goggles at a minimum, is required. Attach the bonding cable to each drum prior to filling.

### **Equipment Needed**

- Air force or wooden pallets
- Plywood sheets (if using Air force pallet)
- Cargo straps
- Drum markers/ "Paintstiks"
- Gasoline stickers (if applicable)
- Bung wrench
- Absorbents
- Drum Order Tracking Sheet
- Face shield

### **Filling Procedure**

Fuels Control will fill out and issue a Drum Order Tracking Sheet. The drum order tracking sheet lists what type of pallet is required and what type of fuel will be used, as well as the destination and Science Event number. It is very important to ensure that this form is properly and completely filled out and returned to Fuels Control when the entire order has been filled.

Fuels Control will order the aircraft pallets and plywood from Cargo. If you need to move an Air Force pallet by hand, use "pallet pullers." A "pallet puller" is simply the hook end of an unserviceable cargo strap, with several feet of strap still attached, with a knot tied in the strap to provide a gripping surface.

### **Drum Placement**

Normally, a milvan filled with flying drums is staged near the Mogas sump, which is also where Premix and Mogas drums will be. The sump is near the gasboy fueling station, directly

downhill from the Fuels Barn. There will also be a milvan of Aviation drums, for AN-8 filling, located near the heliport sump.

Make sure the sump is free and clear prior to the arrival of Cargo. Place dunnage on the sump and help the Cargo operator place the pallet if necessary. Place plywood sheets on top of the pallet, making certain that the base of every barrel will be on wood, to avoid damaging the aluminum surface of the pallet.

## Drum Labeling

**Each drum must have the following information written LEGIBLY on it:**

(This information is to be written in its entirety on the side of every barrel with characters 1" high. Any smaller is illegible, and any larger becomes obtrusive.)

- Type of Fuel
- Fill Date
- Science Event #
- Delivery Location

On top of the barrel, in smaller characters, write the Type of Fuel and the Date of filling.

Write with black "Sharpies" on orange barrels, and with "Paintstiks" on black barrels.

**A note about labeling:** there's a good chance that the drums you fill today will be refilled again and again. Therefore, you need to write as legibly as you can in the smallest amount of space possible, as long as a loader operator can read it from the loader. **Large scrawling letters are unacceptable.**

Most orders using Air Force pallets will call for 12 drums, thus it is important that those drums that will be in the interior of the pallet are labeled prior to filling, as it is very difficult to move full drums and **every drum must be labeled completely.**

Once you have labeled the drums that will be in the interior of the pallet, you can stage the drums (three rows of four drums) on the plywood-covered pallet. Run two cargo straps around the entire lot, as a "belly band." Two additional cargo straps will be added over the top after drums are filled.

**Note** It is extremely difficult to reposition the drums on the pallet after they are filled. A little extra care in removing excess space and getting the cargo straps snug at this point could prevent the straps from working loose and allowing the drums to shift in transit.

## Drum Filling

The service tank for Mogas and Premix drum filling is M3. No pump will be used – this is a gravity transfer. Obtain and call-in a start dip from M3. When dipping M3, be sure to use a dip tape with a bonding cable and clip the bonding cable to the metal of the tank prior to lowering the dip tape into the port.

Check that the nozzle in the orange box on the sump is in the shut-off position, and that there is nowhere else for the fuel to go. Take the key labeled M3A with you and unlock the valve. Open M3A , M7 and the two 2” valves. Notify Fuels Control when you open these valves.

Once a good start dip has been taken and all the valves are open, you are ready to start filling drums.

**WARNING: To reduce the potential for spark-induced fire or explosion, the bonding cable must be clipped to each drum BEFORE filling. Failure to follow this warning could result in death or severe injury.** This is especially crucial with Mogas, as it has a much lower flashpoint than diesel fuels and the danger of spark-induced combustion is higher.

AN-8 drums will be filled at the heliport sump. Get drums from the milvan located nearby. Filling procedures are the same as for Mogas/Premix. The service tank for this procedure is Heliport Tank #1 or #2, and the tank you should use will be marked with a magnet reading “Service Tank.” The fuel will be pumped through the heliport pumphouse.

Most drum fillings will occur after the heliport system has already been opened for the day. In this case, you will need to open only two valves: Valve J-54 (the right hand valve at the triangle) and Valve J-60 (the 2” valve near the meter at the sump).

If the heliport has not been opened for the day, the alpha valve on the service tank will also have to be opened.

Each drum will be filled to approximately 50 gallons. The fuel level should measure 4” below the top of the drum. There are meters at both sumps to aid in filling, but **YOU MUST DIP EVERY DRUM.** If you are doing Premix drums, add the Premix oil to each drum prior to filling with Mogas. This helps mix the fuel and oil together and reduces the chance of overfill. **No drum shall be sealed until it has been dipped and the proper quantity of contents confirmed. Drums cannot go out to the field underfilled or overfilled.**

Start filling the drums in the middle of the pallet and work your way out. **Remember to move the bonding cable to each new drum.** The interior drums should already be labeled and you can label the rest as you go. At this point you can also start tightening the bungs. Remember, a lot of these drums will be dropped out of an airplane. Think about it. Use the bung wrench

and tighten both the large and small bungs as tightly as possible. You may want to label after you have tightened the bungs as sometimes the barrel markers smear when you lean across the drums to tighten the bung caps.

## **Drum Packaging**

Once all the drums have been filled and labeled, tighten the bellyband around the drums. Make sure none of the labels have been smeared and that they are legible to a forklift operator or someone in bad weather at a deep field camp. Then place pieces of small dunnage on two of the interior drums and fasten cargo straps to the metal loops on one side of the Air Force pallet. (If it's a 4-drum wooden pallet, use one strap and one piece of dunnage.) Attach the cargo straps to the other side of the pallet and tighten them down. Cargo will re-package the pallets for flight, but we need to be certain they can be safely transported to Building 140.

Fill out the Drum Order Tracking Sheet and return it to Fuels Control. This is an important tool for ensuring expedient and proper delivery.

## **Final Processing**

Once the Drum Order Tracking Sheet has been given to the Fuels Coordinator, the Coordinator performs the following steps:

- Call either Cargo or Fleet Operations to pick up the order and have it delivered to the proper place.
- Record the date and time the drums are picked up.
- Record the drum issue information into the Fuels Control Log Book.
- Record the drum issue information into the Fuels Spreadsheet titled *Drums*.
- Send e-mail messages to Science Support and Science Cargo, confirming that the order has been filled and picked up.

Once all above steps are complete, the copy of the Drum Order Tracking Sheet is filed, along with a copy of the confirmation e-mail.

## **References**

OP-M-932a *Drum Order Tracking Sheet* – blanks available on McMurdo Fuel's drive – J:\Fuels\Drums\Drum Order Tracking Sheet.doc.

Fuels Spreadsheet – available on McMurdo Fuel's drive – J:\Fuels\Coordinator.

## Records

Record Identification, Format, & Owner	Active Location Storage, Protection, & Retrieval	Facility Storage, Protection & Retrieval	Retention Time (Active and/or Facilities)	Ultimate Disposition
<p>Drum Order Tracking Sheet.                      Hard copy.                      Owner: Filled out by Fuels Operator filling fuel drums. Recording of information, notifications and storage are the responsibility of the Fuels Coordinator.</p>	<p>Drum Order Tracking Sheet forms are located on the Fuels drive at J:\Fuels\Drums\Drum Order Tracking Sheet.                      When Drum Order Tracking Sheets are completed, hard copies are filed in the Fuels office. The information from the hard copy is entered into an Excel spreadsheet, where it is stored electronically. The spreadsheet is located on the Fuels drive at J:\Fuels\Coordinator\season dates\Fuels Spreadsheet. There is a tab on the spreadsheet labeled "drums". The information is also recorded in the Fuels Control Log Book in the Fuels Office. The Excel information is available only to people with viewing authorization for the Fuels drive.</p>	<p>N/A</p>	<p>Hard copies are retained for one calendar year.                      The Excel spreadsheets are kept for five years.                      Spreadsheets from previous years are stored on CDs in the Fuels office.</p>	<p>Hard copies are disposed of in white paper recycling bins. Outdated CDs are destroyed.</p>

## Attachments, Appendices

None.