

PART 1: AVIATION FUEL QUALITY MANUAL (AFQM)

The Air Navigation Order (ANO) requires the manager or an organisation controlling a fuel installation to ensure that the installation is in fit condition to store and to dispense fuel to aircraft, and that while in storage the fuel remains fit for dispensing to aircraft. In addition, records are required to be kept of all receipts and issues of fuel, fuel sampling and installation maintenance checks.

Negligence or errors made in the receipt, storage and handling of fuel can endanger an aircraft and the lives of all on board. It is essential that the correct grade and quantity of fuel is supplied, and that it is in a condition fit for use in aircraft.

1.0 BMCSO BASE FUEL PROVISION OVERVIEW

The BMCSO bases below have the following fuel provision/s. More detailed/base specific information can be found in the BMCSO OM-E: LBI's that are located on the company Web Manuals page which can be found at the following links.

Personnel will need to use their own login details which can be generated by contacting the BMCSO web manuals custodian.

[Web Manuals - Reader](#)

Base Information: Web Manuals > Babcock Onshore > EFB > Operations Manuals > OME

Fuel Asset User Guides: Web Manuals > Babcock Onshore > EFB > Ground Operations & Handling > GSE Manufacturer Manuals > Fuel Browsers

Servicing records for BMCSO fueling assets can be found at the following:

<P:\MCS\BAS\HQ Data\Engineering\Browsers, GSE, TLC & vehicles\Browsers and Fuel\Servicing Reports>

1.0.1 Aberdeen

Fuel will be provided by Aberdeen Airport. A 2'000L mobile browser can also be utilised.

S/N – 13860. BP Owned, Leased to BMCSO.

1.0.2 Almondsbury

Fuel is provided by a 10'000L fixed fuel installation on the end of the Eastern apron.

S/N – 29206. Customer Owned and Maintained.

1.0.3 Barton

Fuel is provided by a 2'000L mobile browser. An 18'000L fixed fuel installation is also available if required.

S/N – 5036/1. BMCSO Owned and Maintained.

1.0.4 Blackpool

Fuel is provided by a Blackpool Airport fuel tanker.

1.0.5 Cambridge

Fuel is provided by a 2'000L mobile browser.

S/N – 13819. Customer Owned. BMCSO Maintained.

1.0.6 Cosford

ABHQ has a 50'000L electrically operated static fuelling system.

1.0.7 Glasgow

Fuel is provided from a 22'500L fixed fuel installation. 2 x 2'000L mobile browser is also available.

22'500L S/N – 15505.

2'000L S/N – 6533 & 6899.

1.0.8 Norwich

Fuel is provided by a 2'000L mobile browser.

S/N – HEN0035 (16741/1). BMCSO Owned and Maintained.

1.0.9 Perth

10'000L Fuel Tank S/N – 15200. Babcock Owned and Maintained.

Fuel is provided by a 2'000L mobile browser. Perth Airport also have a fixed fuel installation if required.

S/N – 16299. Customer Owned and Maintained.

1.0.10 Staverton

Fuel is provided by a Gloucestershire Airport fuel tanker. Several 2'000L are also on site for use.

S/N 6422 – Flight Line Support.

S/N 6396 – Waste Fuel Only (Hangar Support)

1.0.11 Strensham

Fuel is provided from a 15'000L fixed fuel installation.

S/N – 15237. BMCSO Owned and Maintained.

1.0.12 Thruxton

Fuel is provided by a 2'000L mobile bowser.

S/N – THR0002 (16741/2). BMCSO Owned and Maintained.

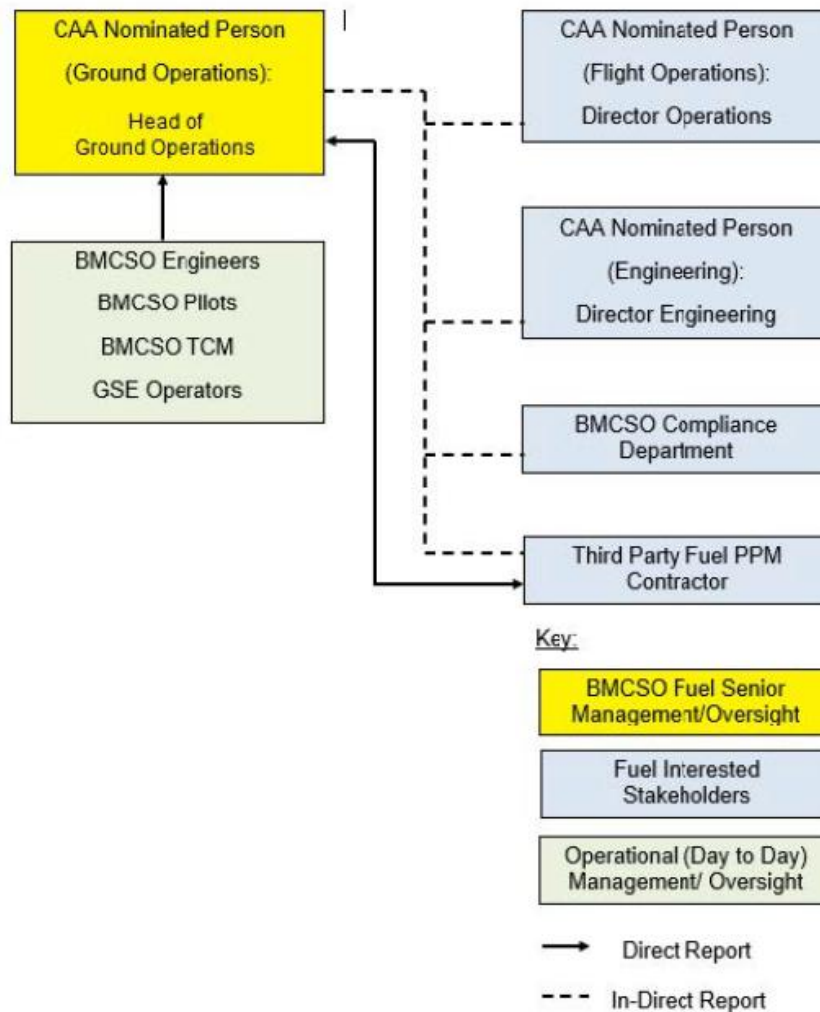
1.0.13 Tiree (Drummed Fuel)

Drummed Fuel is available on Tiree. Managed by Babcock personnel at Glasgow (Clyde).

1.1 GENERAL

All installations used or constructed for use by BMCSO for dispensing fuel comply with current industry best practice. Where any deviation from current best practice is contemplated, the Head of Ground Operations along with the Compliance Manager, are to be consulted prior to any changes being made.

1.1.1 Fuel Management Flow Chart



1.2 TRAINING

BMCSO flight operations personnel inclusive of Engineers shall be thoroughly trained in all fuelling functions and procedures that they will be required to undertake in the course of their duties including emergency actions.

For clarity, new personnel refer to all personnel that join the business post 01 November 2025. Personnel that joined the business prior to this date have been undertaking fuelling functions to this point and are thus considered to be trained.

Existing personnel that are called upon to conduct new or unfamiliar tasks shall be similarly trained before undertaking the task without supervision.

Training is conducted in accordance with, and documented on, Tech Form 164. A copy of which can be found at:

<https://sp.babcockinternational.com/sites/mcsspbas/Engineering%20Publications/Forms/AllItems.aspx?FolderCTID=0x012000B01D9D4CC13CE548B8E843C17D835270&id=%2Fsites%2Fmcsspbas%2FEngineering%20Publications%2FBMCSO%2FTech%20Forms%20%2D%20m21042021%2FTech%20Forms>

And is detailed at 1.0.3.2.

Completed Tech Forms are to be sent to:

operationsofficers@babcockinternational.com

1.2.1 Bridger/Rebulk Training

Personnel that may be required to undertake Bridger/Rebulk training (as operational need requires) are to undertake specific training. This will allow replenishment of the fuel tank to be always completed. This training is also approved to be given to select customer stakeholders.

Training records documenting this training are kept by the Head of Ground Operations.

The training that is required to be undertaken can be found at and documented on the training from detailed in 1.0.3.3.

A training form template can be found at:

<P:\MCS\BAS\HQ Data\Engineering\Browsers, GSE, TLC & vehicles\Rebulk training Form.pdf>

Completed Tech Forms are to be sent to:

operationsofficers@babcockinternational.com

1.2.2 Tech Form 164

Name of Trainee:	
Name of Trainer:	
Base:	
Type of Fuelling Asset:	

Knowledge Required	Demonstrate Task	Trainee's Signature Confirming Understanding of Training.	Date	Trainers Signature
Babcock Fuel Procedures	Refer trainee to: 1. Babcock Ground Support Manual, Part 1: Aviation Fuel Quality Manual. 2. OM-E: LBI for base in Question.			
General Familiarisation	Trainer to Familiarise Trainee: 1. Location of fuel records on company intranet. 2. Location of fuel asset keys and locks. 3. Location of fuel bowser and aircraft sample equipment 4. Location of bowser valves, fuel delivery hose locking and stop/start controls. 5. Location of fire extinguisher(s). 6. Location of Fuel Spill Kit. 7. Contingency Plan SOP including SSoW.03 Working with Dangerous and Hazardous Substances.			

Asset Operation: Starting and stopping	1. Location of the emergency STOP button. Show operation and reset. 2. Locate and open pump supply valve before starting pump. 3. Starting pump. 4. Demonstrate stop procedure (non-emergency). 5. Close pump supply valve and switch off.			
Asset Operation: Sampling References: GSM: AFQM Part 1. GSM: AFMQ Section 1.7 to 1.16). OM-E LBI	1. Refer trainee to GSM: AFQM Section 1.7 – 1.16. 2. Refer trainee to OM-E: LBI for base specific sampling routine. 3. Demonstrate Sampling routine iaw 1 & 2 above. 4. Show trainee what fuel samples should and shouldn't look like (1.10). 5. Discuss and familiarise the trainee with the Shell Detector Capsule (1.12). 6. Discuss failed fuel samples (1.13). 7. Demonstrate the Fuel Sample Retention Process (1.15). 8. Discuss Recycle or Disposal of fuel samples (1.16). 9. Refer trainee to Section 1.17 for their awareness.			
Asset Operation: Fuel Record Retention References: GSM: AFMQ Section 1.2 GSM: AFMQ Section 1.18 OM-E LBI	1. Refer trainee to Section 1.2 to detail Fuel Documentation. 2. Open Excel sheets on P: drive (1.18) 3. Click on tab for the day required. 4. Complete the fuel record.			

Asset Operation: Daily use References: GSM: AFMQ Section 1.20 – 1.24	1. Calculate required amount of fuel. Cross reference with actual fuel amount in aircraft prior to starting refill. 2. Unlock aircraft fuel cap and bowser cabinets. 3. Bond fuel asset to aircraft using bonding cable. 4. Open pump supply valve and start bowser pump. 5. Open hose supply valve and draw hose to aircraft. 6. Bond hose to aircraft and place fuel hose into fuel tank orifice. 7. Deliver fuel as required. 8. Switch on aircraft battery to check fuel contents & progress if required 9. Remove hose and then bonding lead – stow. 10. Remove bonding lead – stow. 11. Close hose supply valve. 12. Shut down pump. 13. Close pump supply valve and switch pump ignition off. 14. Note fuel figures. 15. Turn off aircraft battery, lock fuel cap & return Fuel key 16. Close cabinets. 17. Record fuel delivery as described in the above Fuel Record Retention row.			
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Tech Forms References: GSM: AFMQ Section 1.36 OM-E LBI	1. Refer trainee to Section 1.36 2. Discuss processes detailed in each Tech Form.			
Miscellaneous To be discussed only if required. Any Additional Training Completed:	1. Discuss bulk refuel procedures for the relevant base including separate training form. 2. Discuss Oban fuel bowser (1.31.6). 3. Discuss Barrelled Fuel including pump/filtration system (1.32). 4. Rotors running refuels (1.33). 5. Refuel/Defuel in hangars (1.34)			

COMPLETED FORMS ARE TO BE SENT TO:
operationsofficers@babcockinternational.com

Date Training Completed:	
Signature of Trainer:	
OFFICE USE ONLY BELOW	
Added to Air Maestro By:	
Date Added Air Maestro:	

Applicant's Name:	Click here to enter text.
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Trainer/Assessor Name:	Click here to enter text.	Location (Base):	Click here to enter text.
Bowser S/N:	Click here to enter text	Bowser Model:	Click here to enter text.
I certify that all relevant training/assessment signed off below was completed as described in the Operations AFQM			
Signature		Date	Click or tap to enter a date.

Training/Task Description	Trainer/Assessor*
Ensure relevant Bowser Operators Manual is available for trainee. IAW: AFQM 0.8 and OM-E LBI. (search in Web Manuals for relevant Operations Manual, print or provide PDF copy)	
Discussion had using AFQM 1.4 as reference – Fuel Handling and Storage	
Discussion had using AFQM 1.7 as reference – Fire Extinguishers	
Discussion had using AFQM 1.8 as reference – Fuel Sampling	
Discussion had using AFQM 1.9 as reference – Basic Fuel Sampling Equipment	
Discussion had using AFQM 1.10 as reference – Waste Fuel Control	
Discussion had using AFQM 1.11 as reference – Fuel Sample Visual Appearance Check (Clear and Bright)	
Discussion had using AFQM 1.12 as reference – Microbiological Activity	
Training/Task Description	Trainer/Assessor*
Discussion had using AFQM 1.13 as reference – Chemical Water Detector Check (Shell Detector Capsule)	
Discussion had using AFQM 1.14 as reference – Failed Fuel Samples	
Discussion had using AFQM 1.16 as reference – Fuel Sample Retention	

Discussion had using AFQM 1.17 as reference – Fuel Sample Recycling or Disposal	
Discussion had using AFQM 1.18 as reference – Use of Intermediary Containers	
Discussion had using AFQM 1.19 as reference – Fuel Record Retention	
Discussion had using AFQM 1.20 as reference – Use of Kathon	
Discussion had using relevant chapter(s) in AFQM 2.1 as reference – Rebulk From A Bridger Unit (Fuel Tanker)	
Discussion had using AFQM 2.3 as reference – Fuel Spillage Control	
Discussion had using AFQM 2.4 as reference – Fixed Installation or Fuel Bowser Routine Checks	
Discussion had using AFQM 2.5 (if relevant) as reference – Fuel Trailer Routine Checks	
Discussion had using AFQM 2.6 (if relevant) as reference – Use of Fuel Supplied in Sealed Drums (Barrelled Fuel)	
Discussion had using AFQM 3.1 as reference, ensure file location is available to trainee. If it is not accessible, Base Pilots/Eng to print document so it is available and update the online form when there is a need. – Use of the electronic Fuel Log	
Discussion had using AFQM 3.2 as reference, ensure relevant form(s) is/are available for trainee – Technical Forms used	

1.3 FUEL HANDLING AND STORAGE

The following is applicable to all Fuel Storage and Fuel Delivery Systems:

- a) All BFI/Bowser/Trailer fuel delivery hoses shall be properly stowed until required for use.
- b) Fuel Delivery nozzles are to be stowed and/or secured in their designated nozzle stowage position within the delivery cabinet until required for use.
- c) Fuel Delivery nozzles shall be capped when not in use – unless the designated stowage prevents this.
- d) Delivery nozzles shall be inspected for FOD/Water contamination prior to every use.
- e) Fuel Delivery Cabinets are to be properly closed and secured unless in use.
- f) Fuel Installations including mobile bowzers, that are not regularly in use, must be recirculated in their entirety i.e. their entire contents at that given time, no less than once every seven days. This ensures that the fuel that is held within the hoses along with that of the tank, are passed through the filtration system.

NOTE 1: If for any reason hoses cannot be reeled in and/or stowed, the hose should be laid out away from the operating area and the delivery nozzle should still be stowed in its designated location. The hose should be, if applicable, protected from direct sunlight and inadvertent crushing. If nozzle stowage is also not feasible, the nozzle should be stowed in a protected area away from FOD and Water contamination.

1.3.1 Equipment

There shall be separate fuelling equipment for each product/grade delivered at the location which are clearly product/grade marked.

1.3.2 Pumps and Filtration Units

The pump may be either manual or powered. Where the pump is powered, it shall be of a design suitable for use in hazardous areas. The pump shall also be fitted with a cable of sufficient length to ensure that the power source is located outside of the hazardous areas of aircraft and fuelling operations.

The filtration and pumping unit shall be fitted with bonding wires for bonding to the drum and to the aircraft being refuelled, including designed pressure type clamps.

A meter can also be fitted in the delivery system if required.

1.3.3 Diesel (or Other Fuel) Powered Pumps

Where a diesel (or other fuel) powered pump is in use/required, it is imperative that this fuel is not stored next to the motor in question as this can lead to a significant fire risk. Instead, this fuel should be in the correct intermediary container, as described in 1.0.19 correctly labelled, and stored in a suitable POL locker as described in 1.0.16.

Containers should not at any time, be stored next to the Powered Motor or Pump as this presents a significant fire risk.



Figure 1 - Incorrectly Stored Fuel Container



Figure 2 - Damage Caused to Incorrectly Stored Fuel Container

1.3.4 Hoses

The delivery hose shall be of an approved aviation hose of continuous length, smooth bore synthetic rubber construction complying with the requirements of the latest issue of EI 1529 (grade 2), or ISO 1825 type C (semi-conductive), or type F where needed or in specific applications.

Typical hose applications:

- a) Type C (semi-conductive) – into plane delivery hoses, fueller loading hoses, hydrant inlet hoses and hydrant low flush points.
- b) Type E (conductive), or type F (semi-conductive) – riser (swing) hoses between fixed pipework and elevating fuelling decks and trailer connection hoses.
- c) Type F – (semi-conductive) – regular high flow rate defueling.

A hose end strainer of not coarser than 60 mesh shall be fitted to pressure fuelling couplings and over wing nozzles. For equipment fitted with filter monitors, the hose end strainer shall be 100 mesh.

1.3.5 Delivery Nozzles

Delivery Nozzle hoses shall not have hold open devices. Nozzle spouts shall not be painted or coated and should be fitted with a dust cap where there is a risk of dirt or contamination. Over wing fuel nozzles should be product marked, and colour coded (black handle for jet fuel, and red handle for Avgas).

For Avgas fuelling, nozzle spouts with a maximum external diameter of 49mm shall be used.

Selective spout – For over wing jet fuelling, a nozzle spout with a major axis of 67-70mm shall be fitted.

Not all jet aircraft orifices are sufficiently big enough to accommodate a jet fuel spout. Where this is the case, either from vehicles or kerbside dispensers, they shall be used under extreme caution and controlled conditions.

1.3.6 Pressure Fuelling Equipment

For pressure fuelling equipment with a maximum achievable pump pressure between 50 psi (3.5 bar) and 80 psi (5.5 bar), a hose-end pressure control valve should be fitted to protect the aircraft from excessive flow rate and shock (surge) pressure.

NOTE 1: To determine maximum achievable pump pressure, refer to the manufacturers manual to identify pressure control valves and deactivate all pressure control valves. Establish maximum flow rate into storage and then slowly close the return line valve over 10-15 seconds. The pressure at zero represents the maximum pump outlet pressure.

1.3.7 Bonding Cables

A bonding cable/reel with a suitable clip shall be provided, electrically bonded to the vehicle/trailer chassis or fuel cabinet.

1.3.8 Spill Kit

Sufficient spill kit should be with a reasonable distance to all fuelling locations. The contents of the kit should comply with local regulations and include absorbent mats. Used pads should be disposed of under applicable waste regulations.

1.4 TRANSPORTATION OF FUEL (DANGEROUS GOODS) BY ROAD

If Dangerous Goods are required to be moved by road, advice should be sought from one of the following:

- a) Head of Ground Operations

- b) Aircrew Training Manager
- c) BMCSO Compliance Department.

1.5 FUELLING EQUIPMENT MAINTENANCE RECORDS

Details shall be recorded of work carried out (servicing, repairs, and replacements) for each item of fuelling equipment. Where work is carried out by non BMCSO personnel, an up-to-date copy of their records shall be sent to the Head of Ground Operations for uploading to the company asset register.

ALL SERVICING AND MAINTENANCE RECORDS FOR ALL FUELLING ASSETS CONTAINED WITHIN THIS DOCUMENT, ARE TO BE SENT TO THE FOLLOWING VIA EMAIL ASAP FOLLOWING A SERVICING OR MAINTENANCE EVENT:

CHRISTOPHER.OAKES@BABCOCKINTERNATIONAL.COM

1.5.1 Manufacturer Fuel Installation/Bowser Instruction Manuals

Manufacturer Fuel Installation/Bowser user guides can be found in web manuals under the following file path:

Web Manuals > Ground Operations and Handling > Fuel Browsers

1.6 FIRE EXTINGUISHERS

Fire extinguishers should be maintained in accordance with the manufacturer's recommendations and appropriately identified. They should be examined/serviced a minimum of once a year.

All extinguishers shall be serviced by the manufacturer or by an approved contractor at least once per annum. The maintenance dates shall be recorded on a label or tag attached to each extinguisher.

Visual Inspections of the condition of all extinguishers should be carried out on a regular basis, at least every month, by BMCSO users. These inspections should ensure that extinguishers are in their specified places and are readily accessible. If any issues are found with the extinguishers, then the BMCSO Health and Safety Department should be informed. In addition, a report should be made on the BMCSO SMS.

The condition of the hose and nozzle (sound and visually free of blockages) should be checked.

The pressure gauge on permanently pressurised extinguishers should be tapped to check that the pointer is not stuck and is within the safe zone.

Dry powder extinguishers should be inverted and shaken at least once every six months to prevent the powder from caking.

All fuelling vehicles and trailers shall carry at least two 9 kg dry powder fire extinguishers in quick release housings. If this is not possible then the same (or larger) dry powder extinguishers should be readily accessible and available on the apron.

For small capacity trailers (less than 500 litres) and fixed fuelling cabinets, a single 9 kg extinguisher is acceptable. Dry powder chemical extinguishers shall be used. If mobile browsers are used, fire equipment should also be positioned away from the fuel container.

1.7 FUEL SAMPLING

Clear, clean glass jars of at least 1 litre capacity, with wide necks and screw caps, or closed sampling glass containers (visijars) shall be used for product examination and sampling, in connection with the visual appearance check and water detection check and should not be used for flushing activities before sampling.

Ensure that the sample container is scrupulously cleaned and clear prior to the check, and that you have a sample size of at least 1 litre from each sample point. The minimum sample quantity required to sufficiently sample fuel is as follows:

- Jet A-1: 3 litres (comprising sump, filter, hose end samples x 1 litre each)
- Avgas: 3 litres (comprising sump, filter, hose end samples x 1 litre each)

Sampling procedure for specific base installations can be found in the OM-E: LBI's however, all sampling of aircraft and fuel Installations will follow the general principles given in this section.

- a) Samples are drawn off at the full flow obtainable from the installation sample points into clear, clean glass jars or, a visijar of at least a one litre capacity.
- b) Sampling is conducted daily, prior to use, unless the fuel installation is not in use (i.e. a trailer only used at weekends). In this instance sampling must occur prior to use.
- c) All retained samples must be identified by the date of sample, and the point of sample, for example, Filter 01/06/22. This information must be visible on the glass jars that hold the sample/s.
- d) Both Appearance and Shell detector capsule checks are carried out.
- e) Plastic or mild steel equipment are not to be used.
- f) Plated mild steel containers (jerry-cans) are to be used for waste fuel only.

- g) Electrical bonding fittings are to be used whenever fuel sampling is carried out.
- h) All fuel samples must be stored in a secure, suitably constructed, light-excluding store, and kept away from sunlight until they are disposed of. This is due to aviation fuel being susceptible to the degradation by UV light.
- i) A stainless-steel bucket can be used instead of a glass jar to drain fuel from the installation sump and filter(s), prior to completing the mandatory Appearance, and Shell detector checks in the glass jar however, the stainless-steel bucket should be cleaned of all previous detritus prior to use. This serves two purposes:
 - i. All installations produce water through condensation, mainly in the tank, which can be drawn out through draining using the bucket, prior to sampling in glass jars.
 - ii. An unrepresentative "pipe sample" can be avoided by clearing the line/hose/pipe of fuel prior to taking the first sample.
- j) The glass jars and stainless-steel buckets must be cleaned immediately prior to use, by following the below steps. Personnel should also ensure that suitable fuel proof gloves and safety glasses are worn, and blue absorbent pads are available under the containers to capture any spillage/s.
- k) During periods of precipitation, care should be made to avoid contamination of the sample by water.

1.7.1 Glass Jars

The previous days fuel samples can be used to aid the cleaning of the glass jars.

NOTE 1: As the fuel that has been held as samples has previously been confirmed as safe for use, most of the sample/s can be (if possible, to do so) returned to the fuel installation. If, however, any fuel was not deemed suitable for use, then it should be decanted into a waste fuel drum.

1. Once most of the previous day's sample has been decanted, ensure that the lid is secure before gently swilling the remaining fuel inside the glass jars. Do not shake the glass jars.
2. Remove the lid and pour the residual fuel in the jar into the waste fuel container.
3. Using a low lint towel/cloth, wipe the inside of the lid, the shoulders, the sides, the corners, and the bottom of the jar soaking up any residue fuel and taking any water and contaminants with it.
4. Check the jar contains no residue towel/cloth or liquid.
5. If the process needs to be repeated, clean fuel from previous samples that are due to be recycled can be used.



Figure 3 - Representative Glass Sample Jar in cage

1.7.2 Buckets

Buckets used for flushing shall be manufactured from stainless steel or lines with white enamel. The enamel lining shall be no thicker than 2mm to allow for static discharge to dissipate. Buckets shall be equipped with a bonding cable and clip.

1. Shake out the dry stainless-steel bucket over the FOD bin.
2. Placing the bucket on the floor/absorbent pad, slowly pour up to 1 litre of fuel around the inner sides of the bucket using clean fuel from a sample due to be recycled.
3. Pour the residual fuel from the bucket into the waste fuel container.

NOTE 1: The bucket, when used to assist the fuel sampling process, must be scrupulously clean prior to use to remove any contaminants. The bucket should also be bonded to the fuel installation.

NOTE 2: Daily sampling must be repeated after prolonged precipitation, even if a check has previously been conducted within that duty period.

NOTE 3: Other than unopened drum stocks, the maximum permissible period in which an installation is not sampled, due to non-use should not exceed 7 days since the date of the last sample. It is recommended

that this sample be conducted 20 mins after the completion of the fuel recirculation demands made in 1.4 (f).

1.7.3 Visijars

See 1.0.11

1.8 BASIC FUEL SAMPLING EQUIPMENT

Basic fuel sampling equipment should consist of the following items:

- a) 1 x POL locker large enough for all current and (7 day) historic samples and equipment.
- b) 1 x Stainless-steel bucket with attached bonding cable and clip.
- c) 1 x Stainless-steel funnel.
- d) 1 x Set of syringes.
- e) 1 x Set Shell water detector capsules. These should be in date as shown in Figure 8.
- f) 1 x Pair of safety glasses.
- g) 1 x Pair of oil-resistant gloves.
- h) 1 x Tissue roll or cloth for cleaning sample container.
- i) 1 x wide neck 3.5L clear glass jar with cage or, a visijar per sample point.
- j) 7 x sample retention tins, or 7 opaque sample retention glass bottles.

1.8.1 Bridger Sampling Equipment

Bridger fuel sampling equipment should consist of the following items:

- a) 1 x Bridger sample retention tin or Opaque glass bottle.
- b) 1 x Relative Density Calculator.
- c) 1 x Hydrometer.
- d) 1 x Thermometer.
- e) 1 x wide neck 3.5L clear glass jar with cage.

1.9 WASTE FUEL CONTROL

Refer to Flight Operations Manual Part E – Local Base Instructions for base specific instructions.

NOTE 1: Fuel that has passed the appearance and shell detector checks can be recycled for future use.



Figure 4 - Representative Waste Fuel Drum

1.10 VISUAL APPEARANCE CHECK (CLEAR AND BRIGHT)

This check is a field test to confirm that aviation fuel is of the correct colour and is visually clear, bright, free from visible water droplets or particulates, and free from haze or cloudiness at ambient temperature (at the time of sampling).

Samples for a visual appearance check shall be drawn into clean, clear glass jars or visijar as described in 1.0.8. A minimum of a 1 litre sample shall be taken after flushing the sample line (where possible).

The Appearance check should be made after imparting a swirling motion into the liquid so that any solid particles or water droplets are drawn into the vortex created. This can be carried out manually in the glass jars or on some installations, automatically by the ALJAC visijar sampler that forms part of the installation pipework.



Figure 5 - Representative Visijar Sampler



Figure 6 - Example of good vortex created by Visijar Sampler

1.10.1 Colour

Colour. The colour of Jet fuels may vary, usually in the range from water white to straw yellow colour. Some grades of aviation fuel can also be dyed to aid identification.

1.10.2 Water

Undissolved water (free water) will appear as droplets on the sides, or as bulk water on the bottom of the sample jar.

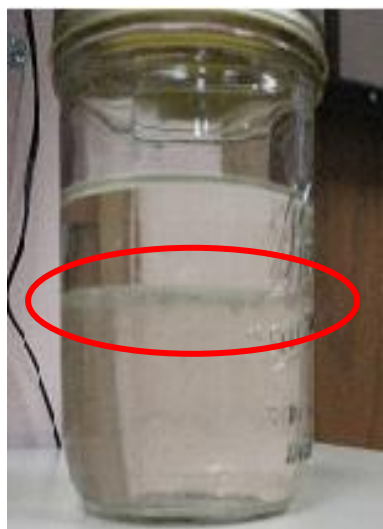


Figure 7 - Undissolved (Free Water) in Jet A1

In Jet fuel water can also appear as a cloud or haze (suspended water).

NOTE 1: Small air bubbles may also appear as a haze.

NOTE 2: Air bubbles can appear in fuel samples from filter vessels for 2 to 3 days following a filter change. If there is any sign of a haze, the sample should be left for 60 seconds to determine whether this indicates presence of air or water.

NOTE 3: Air bubbles will settle out upwards whilst water will either remain or will settle to the bottom of the jar where the droplets can form together to create free water. See also 1.0.15 regarding FSII.

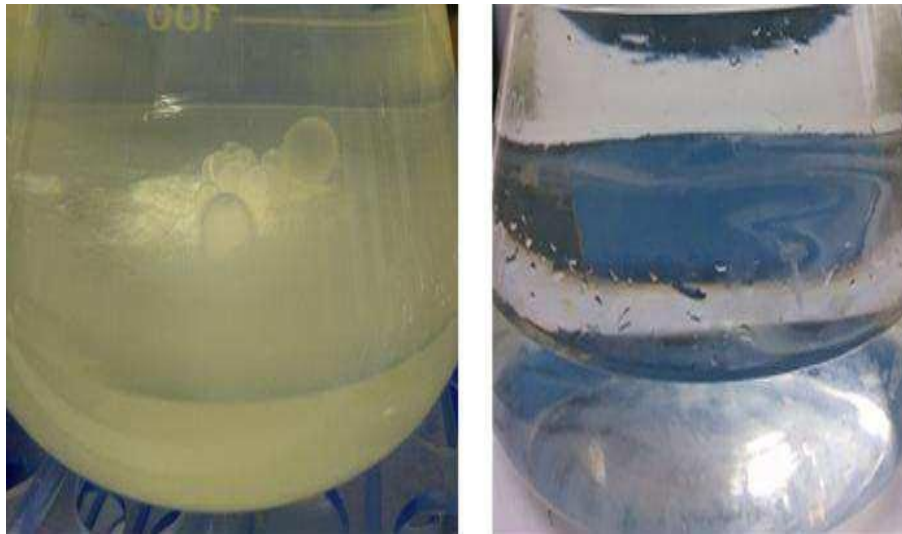


Figure 8 - Haze (Suspended Water) versus Clean and Clear Fuel Sample

1.10.3 Solid Matter

Solid matter or sediment is usually made up of small amounts of dust, rust, hose etc. suspended in the fuel or settled at the bottom of the glass jars or installation. When testing for solid contaminants, swirl the sample to form a vortex as described in 1.0.11. Any solids present will concentrate at the centre of the vortex making it more readily visible.

NOTE 1: 'Trace' amounts of sediment are acceptable. If more than a 'trace' of solid matter is detected, the sample should be rejected.

NOTE 2: British Ministry of Defence Standard DEF-STAN 91-091 which is published in adherence to CAA regulations, defines the acceptable limits of solid matter in Jet A-1 as 1.0 mg/l at point of manufacture, however, as guidance in the context of a visual appearance check as part of a field test, a 'trace' of solid matter can be defined as, 2 to 3 particles of debris not exceeding 0.5 mm diameter.

1.10.4 Clear and Bright

The terms "Clear" and "Bright" are independent of the natural colour of fuel.

"Clear" refers to the absence of sediment or emulsion.

"Bright" refers to the sparkling appearance of fuel having no cloud or haze.

NOTE 1: If any water/dirt is observed, the sampling process shall be repeated until a clear and bright sample can be obtained.

1.11 MICROBIOLOGICAL ACTIVITY

The fundamental method for assessing the presence of microbiological growth in storage tanks and filters, is the daily visual appearance check on a sump sample. Water bottoms that appear microbiologically contaminated; cloudy, discoloured, a lacy/foam interface between the fuel and water layers or organic debris in the fuel or water layer, are all indications of microbiological activity, requiring immediate further investigation and appropriate expert advice.

The investigation shall include a test for microbiological activity carried out on a drain line sample, using an approved test kit. Internal and filter investigations may also be required. Approved test kits can be found on the IATA recommended list.



Figure 9 - Example of Microbiological Growth

1.12 CHEMICAL WATER DETECTOR CHECK (SHELL DETECTOR CAPSULE)

This field test checks for the presence of finely dispersed free water in concentrations lower than those normally detectable by the visual examination. When a chemical water check is conducted, it should be done using an in-date Shell Detector Capsule.



Figure 10 - Shell Detector Tablets Showing Expiry Date

Samples for a chemical water detector check shall be drawn into scrupulously cleaned clear glass jar or visijar (see Figure 3).

Testing for suspended water should be carried out using a syringe and chemical water detector capsule (e.g. Shell type or an approved alternative). To conduct this check, the following procedure should be adhered to:

- Fit a capsule to the syringe, immerse in the fuel sample and immediately draw a 5 ml fuel sample into the syringe. If the capsule is withdrawn from the fuel and there is less than 5 ml in the syringe, the capsule should be discarded, and the test repeated using a new capsule.
- The action of drawing fuel through the capsule will result in colour change of the paper filament in the capsule if water is present, water content of 0-5ppm will start to turn the filament green and by 300ppm it will have turned bright blue. Examine the capsule for any colour change. If there is any colour change the fuel should be rejected.

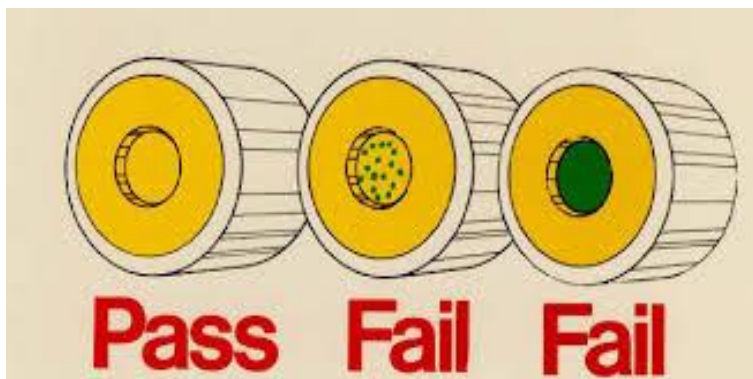


Figure 11 - Examples of Shell Detector Readings

NOTE 1: Shell Detector Capsules are single use only and cannot be used to conduct more than one sample.

NOTE 2: The capsules have a shelf life of twelve (12) months when stored in dry conditions, personnel should discard capsules earlier if storage conditions are not satisfactory.

NOTE 3: After an acceptable sample result the capsule should be deliberately contaminated with water, the resultant colour change will demonstrate that the capsule would have correctly detected an unacceptable sample. There is no necessity to keep used detector capsules to evidence that the capsule has been used during the sample.

- c) Empty the syringe contents slowly with the tip immersed back in the fuel sample. Do not spray the 5ml syringe contents into the atmosphere because this creates a hazardous Jet A-1 explosive mixture.

NOTE 1: If 3 or more sequentially unacceptable samples are obtained with little or no improvement, it may become necessary to swap out the current shell detector packet (containing the capsules), for a new packet. This will allow low level diagnosis of whether there is water in the fuel, or it is just the shell detector tablets that are faulty.

NOTE 2: Persons suffering from colour blindness shall not carry out this test unless it can be demonstrated that the individuals colour blindness will not cause inaccurate reading of the sampling.

1.13 FAILED FUEL SAMPLES

Samples that fail the tests detailed in 1.0.11 – 1.0.13 should be repeated.

If any water/dirt/unusual odour is detected, the sampling procedure shall be repeated until an acceptable sample is obtained.

If an acceptable sample cannot be achieved, then the fuel cannot be used. If not already done so, an aircraft fuel sample should be taken to ensure that contamination is not present within the aircraft fuel system.

In the event of a failed fuel sample, Ground Operations must be contacted at the earliest opportunity, along with the Head of Ground Operations. A company occurrence report must also be submitted.

1.14 FUEL SYSTEM ICING INHIBITOR (FSII)

Fuel system icing inhibitor is an additive to aviation fuel that prevents the formation of ice in fuel lines. Jet fuel can contain a small amount of dissolved water that does not appear in droplet form. As the fuel temperature drops for example, when an aircraft gains altitude, the fuel's capacity to hold water is diminished. This dissolved water can cause a serious problem if it freezes within fuel lines or filters by blocking/reducing the flow of fuel, potentially starving the engine/s of fuel which can cause engine/s to shut down.

FSII prevents this by binding with water preferentially over jet fuel where it then serves to depress the freezing point of water to -43°C. Since the freezing point of fuel itself is usually in this region the formation of ice is now a minimal concern.

Where there is a requirement to measure the concentration FSII in aviation fuel, this should be measured using ASTM D5006 standard test method. This is a field test method that uses a refractometer to evaluate the level of FSII in a fuel sample. The lower detection limit for this field test is 0.02 vol%. The test requires extraction of the FSII into water prior to evaluating the refractive index of the water sample. The test shall be carried out in accordance with ASTM D2624 or IP 274 procedures, using an approved conductivity meter.

NOTE 1: FSII can be present in fuel supplied at some of our bases and can sometimes present in fuel samples as cloudy.

NOTE 2: It is important to correctly drain water from sumps and filter systems. If settled water has not been drained off prior to sampling it mixes up with the fuel (containing FSII) from the tank. If a pool of water is present in the sump of a fuel tank, the FSII will preferentially dissolve in water. It results in a lower-than-expected concentration of FSII in fuel and a pool of water in the sump containing a high concentration of FSII. With a below optimal concentration of FSII in fuel, water that comes out from fuel as the fuel is cooled would not have sufficient FSII to prevent it from freezing. Therefore, fuel containing FSII must be sampled daily.

1.15 FUEL SAMPLE RETENTION

Fuel samples from the following outlets are to be retained:

- a) Hose End – a sample obtained from fuelling equipment delivery hose end coupling or nozzle.
- b) Filter – a sample obtained from a filter body drain point.

- c) Sump – a sample obtained from the material on the bottom surface of the tank or the container at its lowest point.

All fuel samples must be stored in a secure, suitably constructed, light-excluding store, and kept away from sunlight until they are disposed of. This is due to aviation fuel being susceptible to the degradation by UV light.

Notwithstanding installations that contain a PRT as described in 1.0.16.4, the BMCSO accepted standard for fuel sample storage is a metal fuel locker in which daily samples, retention tins, and sampling equipment are usually collocated.



Figure 12 - BMCSO Fuel Cabinet

1.15.1 Hose End Sample

A fuel sample of a minimum of 1 litre from the hose end of the in-use fuel installation, is to be collected daily in a glass jar once the process detailed in 1.0.8.1 has been completed.

Once a sample has been taken, and it has passed the checks detailed in 1.0.11 and 1.0.13, the lid for the glass jar should be secured and the sample kept for a period of 24 hours. The date and point of sample should be annotated on the glass jar as detailed in 1.0.8 (c).

Post 24 hours, this sample should be decanted into the appropriately dated retention tin, as detailed in 1.0.16.5 before a new daily Hose End sample is taken for that period.

1.15.2 Filter Sample

A fuel sample of a minimum of 1 litre from the Filter sample/drain point, is to be collected daily in a glass jar once the process detailed in 1.0.8.1 has been completed.

Once a sample has been taken, and it has passed the checks detailed in 1.0.11 and 1.0.13, the lid for the glass jar should be secured and the sample kept for a period of 24 hours. The date and point of sample should be annotated on the glass jar as detailed in 1.0.8 (c).

If a PRT is available, 1.0.16.4 can be followed.

Post 24 hours, as this sample has already passed the checks detailed in 1.0.11 and 1.0.13, it can be returned to the main fuel tank (or intermediate container as detailed in 1.0.19) for future use, or it can be decanted into the waste fuel drum.

1.15.3 Sump Sample

A fuel sample of a minimum of 1 litre from the Sump sample/drain point, is to be collected daily in a glass jar once the process detailed in 1.0.8.1 has been completed.

Once a sample has been taken, and it has passed the checks detailed in 1.0.11 and 1.0.13, the lid for the glass jar should be secured and the sample kept for a period of 24 hours. The date and point of sample should be annotated on the glass jar as detailed in 1.0.8 (c).

If a PRT is available, 1.0.16.4 can be followed.

Post 24 hours, as this sample has already passed the checks detailed in 1.0.11 and 1.0.13, it can be returned to the main fuel tank (or intermediate container as detailed in 1.0.19) for future use, or it can be decanted into the waste fuel drum.

1.15.4 Installations with a PRT

In some instances, the fuel installation may be fitted with a product recovery tank. When this is the case 1.0.16.1 is to be adhered to. However, either the filter and/or sump sample can be kept in the PRT in accordance with the Local Base Procedures detailed in the OM-E.

Where this is the case, this sample is classed as a blended sample and, the daily samples are to be checked as detailed in 1.0.11 and 1.0.13 and kept for a period of 24 hours.

NOTE 1: The PRT is to be emptied daily, prior to another day's samples being added, and is not to be used for flushing activities prior to sampling.

NOTE 2: Product recover tanks used for recovery of samples taken from fuelling equipment shall be emptied and visually inspected quarterly, without entry, for cleanliness and condition. Cleaning and repairs to internal linings should be carried out/ arranged if necessary.

NOTE 3: Product recovery tanks should be fitted with an overfill prevention system or auto emptying system. Where fitted, all alarms and overfill systems should be function-tested at least every 6 months.

1.15.5 Retention Tins

Retention Tins are to be utilised to store the previous 7 days hose end samples.

The Retention Tins are used on a rotating 7-day basis and are labelled Monday to Sunday.

NOTE 1: Hose End Samples do not get placed into Retention Tins until they have been stored in the Hose End glass jar for a period of 24 hours.

NOTE 2: If Retention Tins are not available, Glass jars can be used providing that there is one glass jar dedicated for each day of the week (7 in total), that are used exclusively for Hose End sample storage.

NOTE 3: Fuel Samples that are kept in retention tins have been checked and deemed as usable prior to being retained. Therefore, this retained fuel can be returned to the main fuel tank without further checking if under 8 days old as detailed in 1.0.17.



Figure 13 - Retention Tins

The remaining acceptable (aggregated) aircraft sample, fuel Installation samples and Bridger samples must be kept in storage until the next sample is taken.

1.16 SAMPLE RECYCLING OR DISPOSAL

Only samples from the previous day in glass sample jars and samples no older than 8 days in opaque tins or bottles; both of which have been stored in an approved container, shielded from natural light and that had passed a Shell detector capsule check may be returned to Tank, provided that the stock record is adjusted to reflect the correct position.

If the above cannot be assured the sample must be disposed of as contaminated waste fuel.

NOTE 1: Ensure Installation hatch lids are free of collected precipitate prior to opening. Never open a hatch while precipitate is falling.

1.17 USE OF INTERMEDIARY CONTAINERS

Fuel that is withdrawn from the fuel installation or aircraft for sampling, may be regarded as aviation quality unless it has failed the sampling checks defined in 1.0.11 and 1.0.13.

If the container is not suitable for the storage of aviation quality fuel due to the known effects of contamination from mild steel or plastic containers, it is now regarded as waste fuel and must only be disposed via the on-site waste stream detailed in 1.0.10.

If a base does not hold a suitable intermediary container as detailed in 1.0.19 then clean samples from the glass jars can be decanted into a clean, as described in 1.0.8.2, stainless-steel bucket for immediate recycling where possible.

Examples of the acceptable and forbidden containers for handling aviation quality fuel samples, and failed samples which become waste fuel, can be found in 1.0.19.

NOTE 1: Failed samples that have been taken for the aircraft require inspection by an engineer before disposing of if possible.

NOTE 2: The sampling equipment listed in 1.0.8 is approved for use with aviation quality fuel.

NOTE 3: Product recovery tanks (bowser and fixed installations), and Glass jar form part of the installation and are not regarded as an intermediary container.

NOTE 4: 205L barrels used for storage of waste fuel for the exclusive purpose of waste fuel collection are not regarded as an intermediary container in this document.

1.17.1 ACCEPTABLE INTERMEDIARY CONTAINERS

1.17.1.1 Reclaimable/Reusable Aviation Fuel Only



Labelling Required:



Figure 14 - Stainless Steel Jerry can with closure (any capacity)

NOTE 1: All containers must have closures and remain closed when not in use. Do not leave the funnel in the jerry can spout.

NOTE 2: All jerry cans should be stored in a POL locker.

1.17.1.2 Waste fuel



Labelling Required:



Figure 15 - Steel Jerry Can (painted) with closure (any capacity)

NOTE 1: Fuel in this container cannot be recycled into the Fuel Installation.

NOTE 2: All containers must have closures and remain closed when not in use. Do not leave the funnel in the jerry can spout.

NOTE 3: All jerry cans should be stored in a POL locker.

1.17.1.3 Forbidden Intermediary Containers

Any container not specified in 1.18.1 is not suitable for handling **AVIATION** fuel samples, for example:



Figure 16 - Petrol/Diesel or Water Containers

1.17.1.4 Fuel for Powered Motors/Pumps (Non-Aviation Fuel)

If small amounts of fuel such as diesel or petrol are required, it is acceptable to keep this fuel in a container that has been correctly certified for use in this manner, for example, a jerry can, as shown in Figure 15, or a 5L fuel can as shown in Figure 17.

NOTE 1: If a fuel Jerry can is utilised, this must be correctly labelled to detail the contents i.e. DIESEL or PETROL.



Figure 17 - Diesel and Petrol Container

1.18 FUEL RECORD RETENTION

All forms completed concerning the receipt of fuel including by not restricted to the below, must be kept for a period of 3 years. Fuel records are held electronically (MS Excel Spreadsheet) at the following location:

<P:\MCS\BAS\Bases\Engineering\Bowser - Fuel Logs>

If the MS Excel spreadsheet is used to record daily fuel usage, copies of the spreadsheet must also be retained for a period of 3 years.

Records for the issue and disposal of fuel must be kept at the base for a period of 3 years.

More information on fuelling documents can be found in Section 1.2 of this document.

1.19 USE OF KATHON

1.19.1 What is Kathon

Kathon is a high-performance antimicrobial agent, developed specially to combat problems of microbial contamination and spoilage in hydrocarbon fuels.

Kathon is not to be used without prior approval from the Director of Engineering.

1.20 FUEL CHECK PROCEDURES

1.20.1 Rebulk from Bridger Unit

1.20.2 Fixed Installation and/or Fuel Bowser Checks Prior to Uplift

Before the uplift of fuel into the installation the following is required:

- a) A fuel sample is taken from each tank/compartment and tested in accordance with 1.0.11 and 1.0.13.
- b) The contents of each tank/compartment must be checked using a dipstick to ensure that sufficient ullage is available to accommodate the proposed uplift.

1.20.3 Bridger Check Prior to Uplift

Before the uplift of fuel into the installation and/or fuel bowser, the following is required:

- a) Check that the Bridger fuel grade markings are correct.
- b) Tank and delivery couplings seals are intact.
- c) For Jet A1, after 3 hours per metre depth of the fuel tank or, 24 hours, whichever is less settling time (from arrival of the Bridger) a fuel sample is to be taken from each tank/compartment and tested in accordance with 1.0.11 and 1.0.13. This sample must be retained in accordance with 1.15 and protected from exposure to light while in storage.
- d) The Control Check (Relative Density) of the sample(s) is conducted and compared against the value shown on the delivery note, the difference should not exceed ± 0.003 (3kg/m³). Fuel deliveries exhibiting a greater difference should be rejected.
- e) The Delivery/Release Note is checked to ensure that it is fully completed.
- f) Ensure your Control Check results are recorded on either the retained release note or Tech form 096.
- g) Ensure that enough Fire extinguishers are available as detailed in 1.0.7.
- h) Ensure adequate quantities of Fuel spill control equipment are at hand.

NOTE 1: "Relative Density" is now the accepted term for "specific gravity". Guidance in the form of an example on how to calculate the relative density can be found on the back of the circular wheel calculator.

1.20.4 Fixed Installation & Fuel Bowser Checks Post Fuel Delivery

- a) The contents of each tank/compartment are checked using a dipstick to ensure that the uplift corresponds to the amount ordered and noted on the delivery note.
- b) The Delivery note is signed.
- c) After 1 hour settling time (from the disconnect of the Bridger unit), the replenished installation is sample checked in accordance with 1.0.11 and 1.0.13.
- d) A record of the delivery and fuel sampling should be kept either in paper or electronically.

NOTE: Where an installation is replenished from an airfield fuel bowser the settling period may be reduced to 10 minutes, and the Relative Density check may be omitted.

1.20.5 Fuel Trailer Checks Prior to Uplift

Before the uplift of fuel into the installation the following is required:

- a) A fuel sample is taken from trailer tank and tested in accordance with 1.0.11 and 1.0.13.
- b) The contents of the tank are checked to ensure that sufficient ullage is available to accommodate the proposed uplift.

1.20.6 Fuel Trailer Checks Post Uplift

- a) The contents of the tank are checked to ensure that the uplift corresponds to the amount ordered and noted on the delivery note.
- b) Delivery/Release Note is checked to ensure that it is fully completed.
- c) The Delivery note is signed.
- d) After 1 hour settling time, the replenished installation is sample checked in accordance with 1.0.11 and 1.0.13.
- e) A record of the delivery and fuel sampling should be kept either in paper or electronically.

NOTE 1: Where an installation is replenished from a pre-checked airfield fixed installation or fuel bowser the settling period may be reduced to 10 minutes.

1.20.7 Supplier Delivery System Check Prior to Uplift

- a) Check that the fuel grade markings are correct.
- b) Tank and delivery couplings seals are intact.
- c) Ensure that enough Fire extinguishers as detailed in 1.0.7, and quantities of Fuel spill control equipment are at hand.

1.21 AIRCRAFT FUEL CHECKS

To be conducted daily as taught during Babcock Induction training.

A sample will be taken from the Aircraft Fuel Tank drain points and aggregated into one clear glass sample jar. (An Appearance check in accordance with 1.0.11 is to be conducted after each sample point).

Once all drain points samples have been taken and acceptable, a Shell detector check can be conducted on the combined sample in accordance with 1.0.13.

NOTE 1: If any aircraft sample fails the appearance check then engineering advice will be sought and the tank compartment will be resampled in isolation in accordance with 1.0.11 and 1.0.13.

NOTE 2: If the combined sample fails the Shell detector check then engineering advice will be sought and the tank compartments will be resampled in isolation in accordance with 1.0.11 and 1.0.13.

1.22 FUEL SPILLAGE CONTROL

All locally approved spillage control plans applicable to the operating site are to be complied with. Advice given hereafter is only to be applied if no locally approved procedures are in force.

1.22.1 Spillage During Refuel

If Spill occurs during the process of refuelling:

- a) Stop refuelling operation immediately.
- b) If possible, stop leak.
- c) Contain the spillage with absorbent materials.
- d) If possible and safe to do so, move the aircraft clear of the spillage.
- e) Inform the person in charge of the site.

1.22.2 Other Spillages

Every operating site should develop a spillage control plan from the general guidance given below, and further advice on that may be sought from the Quality, Health, Safety and Environment Manager.

- a) Evacuation of personnel should be a priority, generally in an upwind and or upslope direction especially if the spill is of major size.
- b) Prevent the movement of people or vehicles in the spillage area.
- c) Notify the local Fire Service, airport/airfield and company management and comply with any requirements they make known.
- d) If appropriate attempt to plug or stop the leak.
- e) Prevent (using the fuel spill equipment available) the spilled fluid from entering any surface water drain.
- f) Do not attempt to flush the spill away or to break down the spilled fluid using detergents or other agents.

1.23 FIXED INSTALLATION ROUTINE CHECKS

1.23.1 In Use/Daily Checks

- a) Fuel may be drained from the installation drain points for the tank sump low point and dirty side of the filter bowl until free from visible water and solid particle contamination.
- b) A stainless-steel bucket may be used where it is expected that the first sample may fail the appearance check (usually pre-filtered samples); once the bucket has been used to clear the line; a sample must be drawn into the glass jar container and sampled in accordance with 1.0.11 and 1.0.13.
- c) The previous day's hose end sample is to be decanted with a stainless-steel funnel from the glass jar into a retention tin or opaque bottle and correctly labelled and retained as detailed in 1.0.16.5.
- d) The remaining dirty filter, tanks sump and week-old hose end samples are recycled or disposed of in accordance with 1.0.17.
- e) The daily samples are then drawn from the tank sump low point and the dirty side of the filter bowl (from the first in-line filter from the tank) into individual sample jars. The samples are then tested in accordance with 1.0.11 and 1.0.13.
- f) An additional "Hose end" sample must then be drawn and tested in accordance with 1.0.11 and 1.0.13.
- g) The installation is inspected to ensure no leaks are evident from the tank or delivery hose & nozzle.
- h) Record the sampling on the company electronic spreadsheet.

NOTE 1: Weekly Checks are no longer required to be completed.

NOTE 2: Glass jar – Depending on the Installation, Glass jar may be installed on pipework as described in 1.0.11, Figure 3.

NOTE 2: One Glass jar may service multiple points via intricate pipework/valves. In any case where a Glass jar is used the fuel will still need to be drawn off for retention and quality checks.

NOTE 3: Some fuel bowzers may have more than one tank drain point. If the low point cannot be ascertained, then alternate sampling between the different drainage points each day.

NOTE 4: Some fuel bowzers sample points may refer to the following:

- a) “Barrel Drain” instead of tank drain sample,
- b) “Sump Drain” instead of Filter sample – dirty,
- c) “Filtered Drain” instead of Filter sample – Clean.

NOTE 5: Ensure that the clean side of the filter is not directly sampled as a hose end sample is taken instead.

1.23.2 Monthly Checks

As detailed in Tech Form 092 – Fixed Installation Serviceability Monthly Check Record which can be found at Annex 1.2.2.1.

1.24 FUEL TRAILER ROUTINE CHECK

When the fuel trailer has been re-filled from an external source, it is to be left to settle for a minimum of 10 minutes, the contents then subject to visual appearance check and a CWD check.

1.24.1 In Use/Daily Checks

- a) Fuel may be drained from the installation drain points, the tank sump low point, and filter bowl, until free from visible water and solid particle contamination.
- b) A stainless-steel bucket may be used where it is expected the first sample may fail the appearance check (usually pre-filtered samples); once the bucket has been used to clear the line; a sample must be drawn into a glass jar container and checked in accordance with 1.0.11 and 1.0.13.
- c) The previous day’s tank hose end sample is to be decanted with a stainless-steel funnel from the glass jar into a retention tin or opaque bottle and correctly labelled and retained as detailed in 1.0.16.5.
- d) The remaining filter, tank sump, and week-old hose end samples are recycled or disposed in accordance with 1.17.
- e) The daily samples that are drawn from the tank sump low point, and filter, into individual sample jars. The samples are then tested in accordance with 1.0.11 and 1.0.13.
- f) An additional “Hose end” sample must then be drawn and tested in accordance with 1.0.11 and 1.0.13.
- g) The installation is inspected to ensure no leaks are evident from the tank or delivery hose & nozzle.
- h) Record the sampling in the spreadsheet.

NOTE 1: Weekly Checks are no longer required to be completed.

1.24.2 Monthly Checks

As detailed in Tech Form 092 – Fixed Installation Serviceability Monthly Check Record which can be found at Annex 1.2.2.2.

1.25 GAMA BOWSER – OBAN AIRPORT

See 2.9.6.

1.26 USE OF FUEL SUPPLIED IN SEALED DRUMS (BARRELLED FUEL)

BMCSO fill their own JET A1 barrels from their 22’500L fuel tank at Clyde Heliport. Where this is the case, the fill and expiry date of the fuel is to be clearly denoted on the side of the drum.

Expiry dates are strictly a maximum of 6 months from the date of filling.

Prior to filling the barrels from the Clyde fuel tank, the tank is to undergo checking and sampling to ensure that the fuel being decanted is suitable for use as barrelled fuel.

Once barrelled fuel is delivered to a suitable storage location, it is to be kept from us for a minimum of 24 hours. It may be necessary to denote a date and time that the fuel becomes usable (post this 24-hour period) on the drums.

Drums should be colour coded in accordance with EI 1542 and should be clearly marked with the product/grade of fuel, batch number, filling date, date of retest (if applicable), quantity, filling location and ‘lead fuel’ statement if applicable.

Delivery of aviation fuel direct from barrels into aircraft shall be avoided wherever possible. Where this is unavoidable then specific procedures, including grade confirmation, shall be developed, and followed.

These procedures can be found in 1.2.10 of this document.

1.26.1 Receipts

No testing is required on receipt of barrels as checks are completed prior to filling the barrels. As fuel is taken from Babcock, for use by Babcock, fuel movements will be logged using the Glasgow fuel log as per all other refuels.

1.26.2 Storage

- a) Different product/grades of fuel should be stored separately to minimise the risk of fuelling error.
- b) There will be a system in place which ensures that batches are used in order of filling date (first in, first out).

1.26.3 Quality Control

Before use, drums will be checked to ensure that:

- a) The barrels have been left to settle for a minimum of 24 hours since they were placed in storage.
- b) They are in good condition and free from any evidence of leakage.
- c) Seals on openings are intact and have not been removed or tampered with (where fitted).
- d) All markings are clearly legible.
- e) The correct product/grade of fuel has been selected, and the batch is still current.
- f) Drums may be carefully rolled or positioned into a suitable position from which to carry out the refuelling.
- g) Drums shall be placed upright and wedged in a tilted position (where possible) with a minimum of 10 minutes settling time before fuelling starts.
- h) On opening, a bottom sample shall be taken from the bottom of the drum by inserting the thief pipe (hollow tube) and subjected to the checks described in 1.0.11 and 1.0.13 to ensure that there is no contamination.
- i) If water or significant particles are found, or if the product is of an unusual colour, the drum shall be quarantined and not released for fuelling.
- j) When opening a new drum, check the product level has not dropped below its normal level. If the level of fuel in any new drum has dropped noticeably then the fuel quality is called into question, and the drum shall not be used for fuelling aircraft.

1.27 BARRELLED FUEL EQUIPMENT

There shall be separate fuelling equipment for each product/grade delivered at the location which are clearly product/grade marked.

1.27.1 Drum Suction Tube

The drum suction tube shall be constructed of aluminium or stainless steel and shall be fitted with a leg or stand to prevent the tube from being closer than 40mm from the bottom of the drum. When not in use the suction tube shall be fully covered and fitted with an end cap to protect it from dust and debris. The drum suction tube shall be inspected and cleaned as necessary before being inserted.

1.27.2 Pump and Filtration Unit

The pump may be either manual or powered. Where the pump is powered, it shall be of a design suitable for use in hazardous areas. The pump shall also be fitted with a cable of sufficient length to ensure that the power source is located outside of the hazardous areas of aircraft and fuelling operations.

The filtration and pumping unit shall be fitted with bonding wires for bonding to the drum and to the aircraft being refuelled, including designed pressure type clamps.

A meter can also be fitted in the delivery system if required.

1.27.3 Hoses

The delivery hose shall be of an approved aviation hose of continuous length, smooth bore synthetic rubber construction complying with the requirements of the latest issue of EI 1522 (grade 2), or ISO 1825 type C (semi-conductive), or type F where needed or in specific applications.

Typical hose applications:

- d) Type C (semi-conductive) – into plane delivery hoses, fueller loading hoses, hydrant inlet hoses and hydrant low flush points.
- e) Type E (conductive), or type F (semi-conductive) – riser (swing) hoses between fixed pipework and elevating fuelling decks and trailer connection hoses.
- f) Type F – (semi-conductive) – regular high flow rate defueling.

A hose end strainer of not coarser than 60 mesh shall be fitted to pressure fuelling couplings and over wing nozzles. For equipment fitted with filter monitors, the hose end strainer shall be 100 mesh.

1.27.4 Delivery Nozzle

Delivery Nozzle hoses shall not have hold open devices. Nozzle spouts shall not be painted or coated and should be fitted with a dust cap where there is a risk of dirt or contamination. Over wing fuel nozzles should be product marked, and colour coded (black handle for jet fuel, and red handle for Avgas).

For Avgas fuelling, nozzle spouts with a maximum external diameter of 49mm shall be used.

Selective spout – For over wing jet fuelling, a nozzle spout with a major axis of 67-70mm shall be fitted.

Not all jet aircraft orifices are sufficiently big enough to accommodate a jet fuel spout. Where this is the case, either from vehicles or kerbside dispensers, they shall be used under extreme caution and controlled conditions.

1.27.5 Fire Extinguishers

Suitable fire extinguisher(s) shall be available or placed within the vicinity of the operations as described in 1.0.7.

1.27.6 Bonding

The drum shall be bonded to the aircraft. The order of bonding should be pump to drum, then pump to aircraft. The bonding between the pump and drum shall not be removed until the pump is removed, and all opening and bungs are replaced.

1.28 PARTLY USED DRUMS

BMCSO do not allow fuelling from part used drums unless the fuel is:

- a) The fuel is used on the same day as opening and,
- b) By the same aircraft of original use.

Partly used drums shall be downgraded to non-aviation use, resealed, and marked with following:

- a) Opened.
- b) Date of opening.

1.29 EMPTY DRUMS

Residues in empty drums shall not be used as aviation fuel. When the drum is empty it shall be re-bunged, clearly marked with the following:

- a) Used
- b) Date of use.

And a line drawn across the product/grade markings with an indelible marker to minimise any possibility of mistaken identity.

Empty drums shall then be stored in the relevant empty drum location.

1.30 DRUM TESTING PRIOR TO USE

Where barrels have been moved, the fuel is allowed to settle for a minimum of 10 minutes before sampling. This means that the barrel(s) MUST be moved the aircraft prior to sampling taking place.

Before use, users must confirm that:

- a) They are in good condition and free from any evidence of leakage.
- b) Seals on openings are intact and have not been removed or tampered with.
- c) All markings are clearly legible.
- d) The correct product/grade of fuel has been selected, and the batch is still current.
- e) Drums may be carefully rolled or positioned into a suitable position from which to carry out the refuelling.
- f) With the barrel on end the lowest point is checked visually for gross water contamination.
- g) A bottom sample is drawn with a plastic tube and transferred to a glass jar.
- h) The sample is tested in accordance with 1.0.11 and 1.0.13.
- i) The contents of satisfactory barrels may be decanted into aircraft fuel tanks, or storage tanks, through a transfer pump drawing via a standpipe with filter and losing suction at least 40 mm from the bottom of the barrel.
- j) A record of usage of barrels is maintained using BMCSO Barrel Fuel Stock Record Form 114 which can be found at:

<P:\MCS\BAS\Bases\Operations\Scotland Barrel Fuel>

- k) Issued fuel will be recorded in the aircraft Technical Log .

1.31 GENERAL FUELLING OPERATIONS GUIDANCE

1.31.1 Fuelling Operations – Consult with OM-E For Site Specific Procedures

NOTE 1: The supply of motor gasoline or diesel fuels to aircraft is strictly prohibited.

1.31.2 Fuelling Personnel

Fuelling operations shall be carried out by competent personnel trained in aircraft fuelling procedures, the operation of fuelling equipment, and the action to be taken in the event of an emergency. Personnel shall be familiar with the location and operation of emergency stop controls and switches on fuelling equipment, and on the apron.

1.31.3 General - Before Fuelling

- a) Refuelling during thunderstorms and significant lightning activity pose significant risks and should therefore be avoided.
- b) Always ensure before starting any refuel that the fuel in the tank is properly settled – either one hour or where an installation is replenished from a pre-checked airfield fixed installation or fuel bowser, the settling period may be reduced to ten minutes.
- c) Fire extinguishers shall be readily available. They may remain on the fuelling equipment provided they are carried in open housings, or in racks with quick opening fastenings.
- d) When the aircraft captain is ready, and it has been ascertained how much fuel is required, and that the grade of fuel is correct for the aircraft, a flight crew member (e.g. non-handling pilot) should check and acknowledge that the daily fuel sample checks as described in 1.0.11 and 1.0.13 have been conducted and are acceptable. Morning samples are generally accepted, but a fresh sample should be requested by the pilot if any discrepancy is noted.
- e) Ensure that the primary bonding lead is attached to the approved aircraft bonding point.
- f) Hoses should be positioned to prevent them from being run over by aircraft-servicing vehicles. Kinking and twisting of hoses shall be avoided. Pressure fuelling couplings and nozzles shall not be dragged over the ground as this promotes contamination. Dust caps should always be fitted while couplings are not in use.
- g) Ensure fire cover is provided nearby in the form of a dry powder extinguisher.
- h) When gravity refuelling, the secondary bonding lead should also be attached to a recognised bonding point on the aircraft.
- i) Open the tank filler cap and insert the nozzle spout. Prepare to operate the fuel lever when signalled to do so by the person in charge of the refuel.

1.31.4 General – During Fuelling

- a) During fuelling, check the fuelling equipment for leaks.
- b) The operator shall position themselves at a point where they have a clear view of the fuelling equipment control panel and aircraft fuelling points. 'Deadman' controls (where fitted) shall always be used and shall never be wedged or blocked open (hold open devices or similar are not permitted, even if manufacturer fitted). The operator should control the fuelling from ground level.
- c) Aircraft maintenance should not be conducted unless the maintenance pertains to fuelling systems. In this case, equipment that is not intrinsically safe, or can cause an ignition source are not permitted.
- d) Fuel spills are considered as fire hazards. Care should be taken when aircraft engines have been in recent use. Hot engines and/or exhausts can form an ignition source so extra care should be taken to prevent spillage of fuel during hot engine operations, particularly when fuelling equipment is near the aircraft. Should a spillage occur, fuelling operations shall be immediately stopped and action shall be taken in accordance with local airport regulations.
- e) If any abnormalities are observed during the refuelling the refuel should be stopped immediately.
- f) When refuelling is complete, or when the pilot signals that tanks are full, the pump should be shut down, and the gravity nozzle handle or pressure refuelling coupling valve handle, returned to the closed/off position.
- g) Unless training has been provided in accordance with the requirements of the fuel supplier related to the provision of additional services, fuelling personnel shall not operate aircraft fuel system controls. It is the responsibility of the pilot or suitably qualified air crew member to determine the volume of fuel to be loaded, and to instruct fuelling personnel accordingly. It is also the pilot or suitably qualified air crew member's responsibility to manipulate aircraft tank valves and switches, and to check the security of tank fill caps, covers and components.
- h) Using a mobile phone on the apron during fuelling operations is strictly prohibited. If it is necessary for the operator to respond to a call, the fuelling operation should be stopped.

1.31.5 General – After Fuelling

- a) Remove the gravity nozzle spout from the aircraft and replace the aircraft filler, and refuelling equipment caps.
- b) Disconnect the secondary bonding lead.
- c) Before leaving the aircraft at the completion of the refuel, the operator should make a final check, including a complete "360 degree" walk around the refuel area, to ensure that aircraft fuel caps have been re-fitted (if they have not, inform a member of the aircrew), that the fuelling vehicle is properly disconnected from the aircraft and that all equipment is stowed correctly.
- d) Position the delivery hose and gravity nozzle away from the aircraft.

- e) Carry out a final physical check that the aircraft filler cap is secure, then disconnect the primary bonding lead from the aircraft, and ensure that all equipment is clear from the proximity of the aircraft.
- f) The delivery hose and primary bonding lead should be rewound onto reels.
- g) Fuelling vehicles should be driven away from the aircraft slowly in a forward direction. Where possible, a marshaller should be utilised.
- h) Enter the fuel quantity onto the Fuel Log sheet.

1.31.6 GAMA Fuel Bowser at Oban Airport

In support of our Scottish operations, it is sometimes required to take fuel from the 2000L fuel bowser based at Oban Airport. This facility is not owned by Babcock however, the owners have provided a fuelling procedure for this asset which is attached below.

Gama Aviation 	Gama Aviation	LPR.GO.101
Oban Fuelling Related Procedures		

1. Background & Purpose

- 1.1. Existing policies and procedures are in place to cover aircraft refuelling or an emergency event during refuelling operations, however, this document is provided to provide a reference framework in support of the temporary fuelling arrangements, through the provision of a lease 2000L bowser, being deployed at Oban Airport in support of the Scottish Air Ambulance rotary operations.

2. References

- 2.1. OM-A-8.2.1 Operations Manual Part A – H145
- 2.2. GMA.HS.030.PR Environmental Emergency Response Plan

3. Base / Applicability

- 3.1. Oban Airport
- 3.2. Rotary Aircraft Crew

4. Procedures

4.1. AIRCRAFT REFUELLING

Note: In the following section, refer to the photographs in Appendix 1 for a visual guide to the referred items

4.1.1. Pre-refuelling

- a. Unlock and open rear roller shutter door (Note: code 1983)
- b. Unlock bunded cabinet (keys hanging inside rear of bowser)
- c. Conduct a sump drain via the hand pump located in the dispensing cabinet. Remove excess water or condensation if necessary. Refer to section 4.2.1.
- d. Unlock and open front pump cabinet
- e. Check diesel quantity and refill if required ❶
- f. Check engine oil level and refill if required ❷
- g. Open tank suction valve ❸
- h. Insert red key into isolator and turn clockwise ❹
- i. Using electric start – turn the key and start engine ❺
- j. Open hose reel valve ❻
- k. Attach bonding cable to stainless bucket
- l. Take fuel sample via dispensing nozzle. Refer to section 4.2.2.

Gama Aviation 	Gama Aviation	LPR.GO.101
Oban Fuelling Related Procedures		

4.2.2. Fuel Sampling

The quality of the fuel is to be tested for water and contamination by means of the litre jar (which must be absolutely clean) and fuel test capsules. The bowser must be left to stand for at least 30 minutes after movement before a test is carried out.

Fuel samples should be taken via the dispensing nozzle into the jar, and not through the sump hand pump.

After the fuel in the jar has settled, a visual check should be carried out for water droplets and sediment in the base of the jar followed by the standard shell water test using the shell detector capsules as follows:

Inspect the sample for free water, suspended water and dirt particles:

- a. After securing the lid to the glass jar, carefully swirl the contents in order to create a vortex. This should concentrate any dirt or free water to the centre.
- b. Free water will appear as droplets or "bubbles" or as a layer of water on the bottom of the sample container. Suspended water, normally only appearing in Jet fuel, produces a hazy or milky appearance in the fuel.
- c. A sample of any grade that does not contain any dirt or water should appear as "clear" and "bright". "Clear" means that there is no particulate matter or sediment in the fuel and "bright" means that the fuel "sparkles" in bright light, having no cloudiness or haze.

Test for the presence of suspended water in a sample of Jet fuel:

- d. Remove one capsule from tube (handle carefully). Do not touch or allow any moisture to come into contact with the yellow paper of the capsule. Close the tube immediately.
- e. With the piston of the syringe fully home, fit the capsule firmly on the nozzle.
- f. Examine the capsule to ensure it is a uniform yellow colour. If it is not, discard it and fit another
- g. Immerse the capsule in the fuel sample and withdraw piston slowly until fuel reaches the 5ml mark
- h. If there is no colour change the result is acceptable and would be recorded as "nil" suspended water
- i. 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.
- j. A few green speckles or a slight change of colour would be recorded as a "trace". A distinct colour change would be recorded as "suspended water".

Post sampling:

- k. If water/sediment is present, clean the jar thoroughly, dispose of the sample in the waste fuel drum in the bonded store and repeat the sample. If, after three attempts, a clear sample cannot be obtained, the fuel in the bowser must be rejected, the words "Contaminated - Do Not Use" written on the bowser fuel record, and Gama Operations in Farnborough informed

Gama Aviation 	Gama Aviation	LPR.GO.101
Oban Fuelling Related Procedures		

4.4. BOWSER REFILLING

Arrangements have been made with Oilfast Limited in Oban to transfer the bowser to Glasgow to be refilled from our on-site Air BP bowser. Oilfast required at least two days notice to arrange the transport to and from Oban, with an intent to complete both journeys within the same day.

We are required to retain a sample of any fuel delivered to the 2,000L bowser; this should be kept at Glasgow and can be disposed of only when the bowser revisits Glasgow for its next refill.

4.5. BOWSER CHECKS

Note: In the following section, refer to the diagrams in Section 3 of the Bowser's Operations manual (Appendix 1) for a visual guide to the referred items

4.5.1. Remote Site (Oban) Checks (Weekly)

The following checks shall be completed on a weekly basis whilst the bowser is station in Oban, with any issues highlighted to Gama Operations in Farnborough.

- a. The Sump Drain and Fuel Sampling should be performed in accordance with the relevant procedures in "Section 4.2 - FUEL SAMPLING".
- b. It is recommended that fuel left stood for extended periods of time should be re-circulated via the dispensing system and returned to tank through the Manway access cover. This ensures any contaminants left in the fuel hose are re-filtered before entering an aircraft. This should be accomplished as follows:
 - i. Open tank suction valve ③
 - ii. Insert red key into isolator and turn clockwise ④
 - iii. Using electric start – turn the key and start engine ⑤
 - iv. Open hose reel valve ⑦
 - v. Pull out hose ⑨ as required from reel – note that the hose reel has an automatic locking device which will hold a reel open at one-metre intervals
 - vi. Open the manway cover on the top of the bowser and place nozzle into the tank
 - vii. Open trigger and commence recirculation.
 - viii. After around 60 seconds, close the trigger.
 - ix. Remove the nozzle and close the manway cover on the top of the bowser
 - x. Reel hose ⑨ back in and return nozzle to holder
 - xi. Close hose reel valve ⑦
 - xii. Close tank suction valve ③
 - xiii. Turn off engine using key ⑤
 - xiv. Isolate power by removing red key from isolator ④
- c. In addition to the above, a general visual check of the condition of the bowser should be completed, with any issues reported.

Gama Aviation 	Gama Aviation	LPR.GO.101
Oban Fuelling Related Procedures		

4.6. FIRE DURING AIRCRAFT REFUELLING

Close liaison must be maintained with the fire brigade to ensure that concerted action will be taken in the event of fire. The following should be adhered to:

IMMEDIATE ACTION:

- a. **Stop all pumping operations.** Activate the emergency stop on the rear of the bowser
- b. **Raise the alarm.** Summon emergency services (during airport operating hours report to the terminal building or call the tower via the radio or call 01631 572906 (2906 from an Airport phone), outside these times dial **999**)
On arrival the fire brigade will take charge; employees should provide assistance at their request if there is no danger to life.
- c. **Tackle fire** with appropriate extinguishers **if safe to do so.**
- d. **Close all bowser valves if safe to do so**
- e. **Disconnect hoses** from aircraft **if safe to do so.**

AS SOON AS POSSIBLE:

- f. **Inform the Airport by radio or telephone**
- g. **Person receiving information to inform the person in charge at the Airport immediately.**
- h. **Attend to injuries,** if there are any
- i. **Cover the telephone and log events**
- j. **Notify relevant Gama Management, Gama Operations Manager, Press Officer**
- k. **No liability for loss or damage is to be admitted either verbally or in writing unless instructed to do so by Gama Management.** Gama personnel must not discuss with any third party (particularly press or media) any details connected with an accident except when instructed to do so by Gama Management, or if required to do so by the police or local authorities. If necessary, brief personnel to direct all third party and media inquiries to the Gama Press Officer.
- l. **Complete and submit an initial report to management**

4.7. FUEL SPILLAGE

General procedures for the response to a spillage are covered in "GMA.HS.030.PR. - Environmental Emergency Response Plan"

In the event of fuel being spilled, the following should be adhered to:

IMMEDIATE ACTION:

Gama Aviation 	Gama Aviation	LPR.GO.101
Oban Fuelling Related Procedures		

5. Emergency Contact List

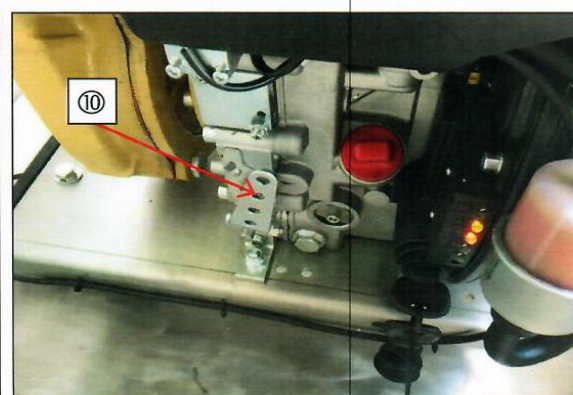
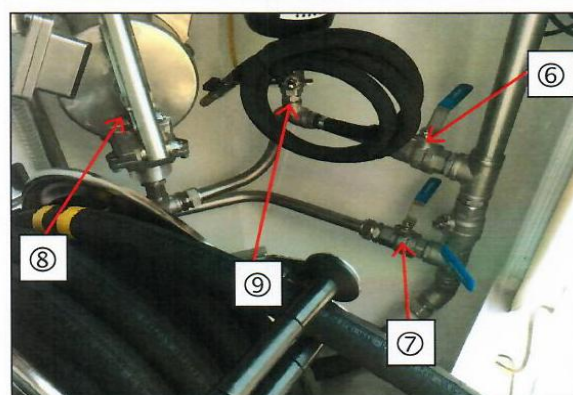
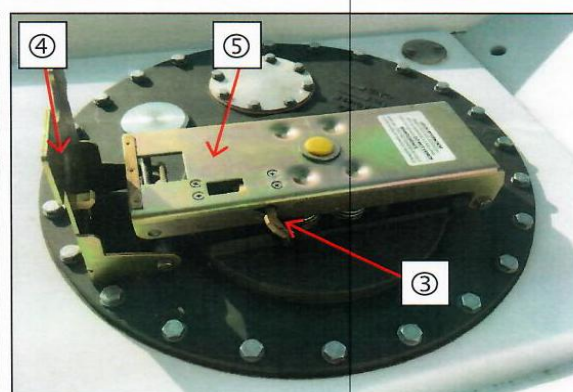
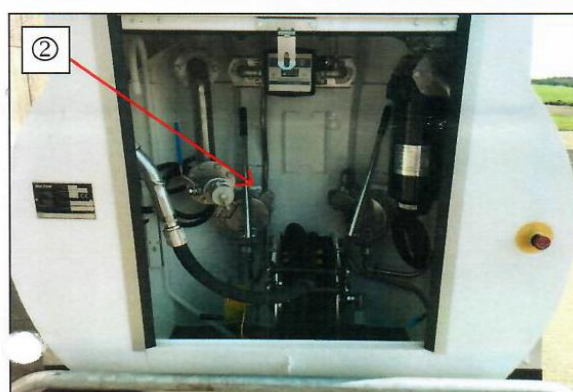
EMERGENCY SERVICE	TELEPHONE NUMBER(S)
Oban Airport Fire Service (during airport operating hours)	01631 572905
External / out of hours	999 / 112

GAMA AVIATION	TELEPHONE NUMBER(S)
Gama Operations	01252 553030
Service Delivery Manager	0141 370 1860 / 07384 833431

OBAN AIRPORT	TELEPHONE NUMBER(S)
Airport Operations (during airport operating hours)	01631 572905
Out of Hours (Station Manager)	07920 586741

OILFAST OBAN DEPOT	TELEPHONE NUMBER(S)
Oban Depot Manager	01631 705999

Gama Aviation	Gama Aviation	LPR.GO.101
Oban Fuelling Related Procedures		



Owner
Date

Service Delivery Manager
September 2020

Page
Revision

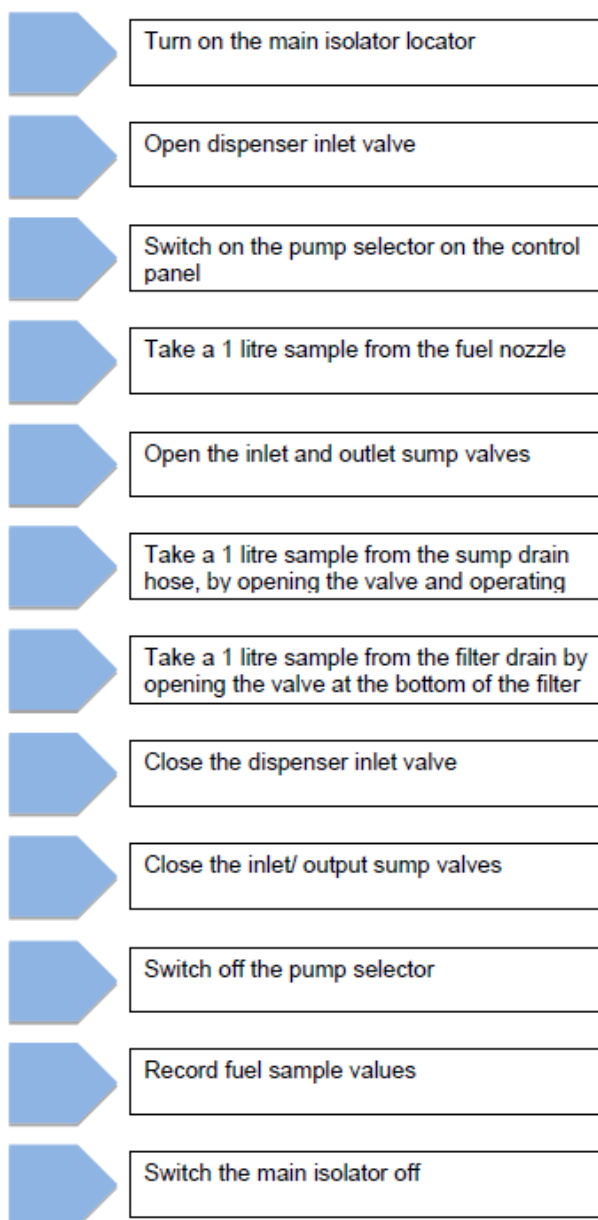
11 of 12
Original

1.31.7 Cosford 50'000L Static Fuelling System

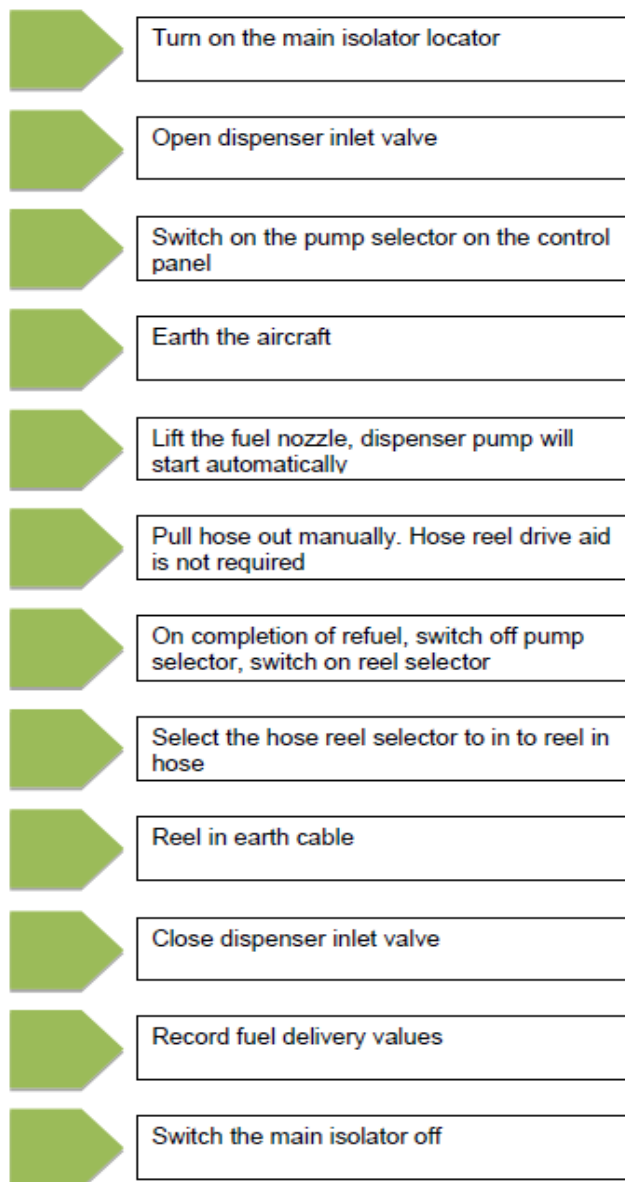
Until such a time as the LBI for Cosford is updated, FSI-A – 44 ABHQ Temporary Operating Instructions should be followed, pages 22 – 25.

The fuel sampling and fuel delivery guides can be found below.

Appendix B – FUEL SAMPLE GUIDE



Appendix C – FUEL DELIVERY GUIDE



1.32 DRUMMED FUEL

Drummed fuel is currently filtered and pumped into the aircraft using the ZVF25 fuel pump, as shown in Figure 18.



Figure 18 - ZVF25 Fuel Pump

1.32.1 Fuel Pump Maintenance

Fuel Pump maintenance activity can be found on the maintenance form below, which can be found at:

<P:\MCS\BAS\HQ Data\Engineering\Bowsers, GSE, TLC & vehicles\Bowsers and Fuel\Servicing Reports\Tiree>

Maintenance activity should be conducted no less, than every 6 months.

Completed maintenance records should be sent to the Head of Ground Operations. Completed Maintenance forms will be input on to the company SMS by the HGO. They will also be stored at the above location.



PORTABLE FUEL PUMP
MAINTENANCE RECORD

FUEL PUMP MAINTENANCE IS TO BE CONDUCTED IN ACCORDANCE WITH GROUND SUPPORT MANUAL 1.32.1			
Base: TIREE	6 Monthly Serviceability Inspection		Date:
Work Required	Observations:	Sign & Auth	
Check & Drain Filter Water Drain (1.1.12.1a)			
Check & Clean mesh inline filter (1.1.12.1b)			
Bonding Cable checked for signs of wear and tear (1.1.12.1c)			
Bonding Cable to be checked for continuity (1.1.12.1c)			
Drain Suction Pipe Stowage (1.1.12.1.d)			
Check & Refill (if required) engine oil. A full engine oil replacement should be conducted annually. (1.1.12.1.e)			
Replace the pump filter a minimum of every 12 months (1.1.12.1.f)			
Additional Comments or Observations			

Completed Forms are to be sent to the Head of Ground Operations:
christopher.oakes@babcockinternational.com

- a) The filter housing water drain shown in Figure 19, should be checked, and if required drained a minimum of every 6 months. Where possible, checks should be made prior to use if time and mission permits.



Figure 19 - Filter Housing Water Drain

- b) ZVF25 nozzle should have its inline mesh filter, as shown in Figure 20, should be checked should be checked, and cleaned a minimum of every 6 months. Where possible, checks should be made prior to use if time and mission permits.



Figure 20 - Inline Mesh Filter

- c) The earthing (bonding) cable should be checked for continuity a minimum of every 6 months. The cable should be checked for signs of wear and tear prior to each use.



Figure 21 - Earthing (Bonding) Cable

- d) The suction pipe stowage area should be drained a minimum of every 6 months.



Figure 22 - Suction Pipe Stowage

- e) The engine oil level should be checked and refilled as appropriate. The engine oil should be replaced annually.



Figure 23 - Engine Oil Refill

- f) The pump filter should be replaced a minimum of once annually.

1.32.2 Operating Instructions

- a) Prior to refuelling, the earthing (bonding) cable should be connected.
b) Insert the suction pipe into the fuel barrel.

NOTE 1: Do not open the suction pipe valve before inserting into the drum.



Figure 24 - OPEN Suction Pipe Valve

- c) Ensure that the DIESEL fuel tank is full of diesel, and the fuel tap is in the ON position.
d) Prime the engine by pulling slowly on the start cord, several times.



Figure 25 - Start Cord

- e) Once the engine has been primed, pull sharply on the start chord. Repeat until the engine starts.
f) Position the ZVF25 nozzle into the aircraft fuel tank and depress the handle to start the refuel.

NOTE 1: When the pump notes changes, this indicates that the aviation fuel drum is empty. In this event, release the nozzle handle, close the suction pipe valve, and remove slowly from the barrel.

NOTE 2: If a second barrel is required, replace the barrel, and complete the actions detailed in 1.1.12.2.

NOTE 3: The flow rate will reduce whilst any air within the pumping system is eliminated. This should not take more than 1 minute with the nozzle fully open.

- g) To stop the engine, push the stop lever forwards, and hold until the engine stops completely.



Figure 26 - Engine stop lever

- h) Close the suction pipe valve before removing from the fuel barrel and replacing back in the suction pipe stowage area.



Figure 27 - CLOSED Suction Pipe Valve

NOTE 1: Do not run the pump dry. In this event, priming of the pump may be required. To do this, remove the plug shown in Figure 28, and fill with aviation fuel before replacing the plug, and trying to start the pump again.



Figure 28 - Starter Plug

1.33 ROTORS RUNNING REFUEL

Refuelling helicopters without engines and rotors running is a routine operation which, from safety considerations, is like the fuelling of fixed wing aircraft. However, if it is necessary to fuel a helicopter with the engines or rotor running, additional safety precautions will be observed.

Except for Helicopter Emergency Medical Service (HEMS), Air Ambulances (AA), and search and Rescue (SAR) on critical missions, the refuelling of helicopters with passengers on board with the engines running is not permitted. Even in the case of HEMS, AA, and SAR, where possible, passengers should alight and position themselves safely away from the aircraft during the process of rotors running refuelling. Passengers and other non-involved persons shall remain at least 50 metres away from the helicopter. In HEMS and AA circumstances (if possible), any passengers that remain on-board must have their seatbelts unfastened. Further information can be found in ICAO Annex 6 Part III.

The refuelling operation shall be supervised by a suitably qualified representative of the helicopter operator, with a qualified pilot at the controls of the helicopter.

The operator shall maintain a position where they can see and be seen by both the pilot at the controls of the aircraft, and the fuelling operator.

Doors, windows, and access points on the fuelling side of the helicopter shall always remain closed during the refuelling process.

Doors, windows, and access points on the non-fuelling side of the helicopter shall remain open during fuelling where possible.

Whenever possible, the helicopter rotors should be disengaged from the engines. Where this is not possible, special attention should be given to the rotor disk, and fuelling equipment located at a safe distance, this being a minimum of 5 meters from the external tip of the main rotor blades.

Fuelling vehicles should never be reversed into position.

Permission is required from the airport owner or authority for rotors running refuels. Airport fire and rescue units shall be on alert (notified) if this service is available. If not, Fire Extinguisher should be available and easily accessible.

1.34 FUELLING IN HANGARS

Fuelling shall not be undertaken in hangars or similarly enclosed buildings, except by special agreement with the customer and relevant airport authorities.

Where it is not possible for fuelling to take place outside, fuelling should be conducted in accordance with any special agreements that are held by the airport/airfield authority.

The following shall be included in any procedures as a minimum:

- a) Airport/Airfield Authority to be notified and special arrangements understood/agreed prior to the commencement of any fuelling.
- b) Sufficient liability cover should also be confirmed prior to the refuelling process taking place. In all instances, refuelling vehicles will remain outside.
- c) Testing of aircraft tank overfill/dump valve testing shall not be performed as part of any fuelling operation.
- d) Supervision of the operation shall be maintained by a nominated person in charge.
- e) Adequate firefighting equipment and spill kit shall be readily available and accessible.
- f) Hangar doors shall remain fully open to aid with ventilation and to allow clear and immediate passage to professional firefighting personnel and their equipment.
- g) All other maintenance activities in the hangar should be suspended for the duration of the fuelling operation.
- h) Only essential staff shall be permitted in the vicinity of the fuelling operation within the hangar.
- i) Only hoses provided and maintained by the fuelling operator shall be used.

1.34.1 Fuelling/Defueling aircraft during maintenance to landing gear/undercarriage.

Fuelling during maintenance to landing gear and undercarriage should be avoided where possible. Where it is unavoidable, it shall be covered by any special agreements with the company, and in accordance with any associated risk assessment, and approved by company management.

1.35 FUEL DOCUMENTATION**1.35.1 COMPANY IT SYSTEMS: USE OF THE ELECTRONIC FUEL LOG**

Records shall be available that show a minimum of the current and previous calendar year.

1.35.1.1 To prepare the Fuel Log

- a) The fuel log for each individual base location can be found at the following location:

<P:\MCS\BAS\Bases\Engineering\Bowser - Fuel Logs>

Computer: L530350S > International (P:) > MCS > BAS > Bases > Engineering > Bowser - Fuel Logs			
Name	Date modified	Type	Size
Aberdeen	30/01/2024 11:07	File folder	
Almondsbury	29/12/2023 16:36	File folder	
Barton	31/12/2023 09:15	File folder	
Benson	31/12/2021 12:14	File folder	
Caernarfon	30/01/2024 11:18	File folder	
Cambridge	31/05/2024 13:34	File folder	
Cork	05/03/2019 14:25	File folder	
Cosford	15/07/2024 08:47	File folder	
Dafen	08/03/2023 14:20	File folder	
Dorset	17/02/2017 18:32	File folder	
Glasgow PS	25/04/2023 15:15	File folder	
Hampshire	31/12/2023 00:00	File folder	
Inverness	01/05/2020 06:52	File folder	
Lowestoft	03/07/2017 10:01	File folder	
Northern Ireland	25/12/2021 18:34	File folder	
Norwich	30/06/2024 21:26	File folder	
Staverton MAAC	06/07/2024 11:09	File folder	
Strensham	26/03/2024 13:10	File folder	
Tatenhill Staffs	31/12/2023 11:16	File folder	
Welshpool	01/10/2023 08:21	File folder	

- b) Open it, by double clicking the left mouse button making sure to select "Enable Macros" when the screen prompt appears, this will allow the calculations necessary for the programme to be performed to take place.
- c) When the Workbook opens, along the lower edge several spreadsheet tabs will be visible, select Daily; if the Daily tab is not visible move the scroll bar to fully left, daily will now appear, and then click on it.
- d) Some header detail fields may need to be completed in this view; they are:
- Serial Number,
 - Heli fuel Stock on Start of month.
 - Installation name if not already visible.

NOTE 1: The red triangle at the upper right hand of the grid boxes will give you a screen prompt if you rest the cursor on it.

NOTE 2: For new month - copy of last month's fuel log/the master log and rename for the current month.

NOTE 3: Green cells on the daily tab may need to be completed (first date of month, opening fuel balance, bowser location, bowser registration number).

ONSHORE		AVIATION FUEL CONTROL DAILY FUEL RECONCILIATION LOG - ONSHORE			
Mission Critical Services					
Helifuel stock on:				Installation / Bowser Registration:	
Start of Month	Jul-24	366	Litres	Cheshire	5036/1
Helifuel stock on:				Bowser Volume:	
End of Month	Jul-24	1011	Litres	2000	
		Sample		Opening	Closing

NOTE 4: **Opening fuel balance should always equal the closing balance of the previous month.** If this is not the case, a delivery or uplift has been missed from either this month or the month before – review to see where the discrepancy is and make necessary corrections.

JET A-1		Vehicle Reg / Location / Installation -		5036/1		Cheshire			
Form No: TECH/098		Test visually for sediment. Test for water with capsules / paste				Issue / Amdt B/01			
ONSHORE		AVIATION FUEL QUALITY CONTROL DAILY ISSUE SHEET							
Mission Critical Services									
When a BAS operated Fuel Bowser or Trailer is replenished from and Airfield Bowser, the period between replenishment and sampling BEFORE first issue to an aircraft is a minimum of 10 minutes, when the replenishment is from a Bridger type vehicle the settling period is 1 hour									
JET A-1		Vehicle Reg / Location / Installation -		5036/1		Cheshire		Date: 01-Jul-24	
Aircraft	Registration	Bowser /	Sample	Meter Reading		Total	Received /	Times	Refuellers
Type	Operator	Tank in use	Qty			Delivered	De-Fuel	Finish	Name
		5036/1	5	F	500092	97	500		
				S	499995				
				D	97				
		5036/1		F	502	10			
				S	500				
				D	19				
				F	502				
		5036/1		S	502				

1.35.1.2 To use the Fuel Log

- Open the Daily Record page for the current date by selecting the appropriate tab.
- Enter the last known fuel stock position or the flow totaliser reading in grid F16 (it has a red triangle in the top right corner).
- Enter the amount of fuel drawn off for Daily sampling in grid D15, hose end samples should not be included in this amount.
- Hose end samples will have altered the totaliser reading so enter the new totaliser reading in grid F15, grid H15 should then show the amount drawn off and you should complete grids N15, O15 and P15 as required.
- Issues to aircraft will alter the totaliser reading so enter the new totaliser reading in grid F15, grid H15 should show the amount issued off and you should complete grid P15 with name of the person who carried out the re-fuel.
- If the bottom of page 1 is reached, carry on recording issues on page 2 and 3, if necessary, at each day's end check that the amounts shown at bottom of page 1, 2 or 3 have transferred to the Daily Reconciliation page correctly.

NOTE 1: Fuel should **never** enter a negative balance (physically impossible for a bowser to contain less than zero fuel. At the end of each day, review the day's closing balance on 'Daily' tab. If in negative balance, it will highlight red to show the error. The balance will also change to yellow as a warning if the fuel balance is less than 50% of full capacity. Review the log for discrepancies and make necessary corrections.

ONSHORE		AVIATION FUEL CONTROL DAILY FUEL RECONCILIATION LOG - ONSHORE			
Mission Critical Services					
Helifuel stock on:				Installation / Bowser Registration:	
Start of Month	Jul-24	366	Litres	Cheshire	5036/1
Helifuel stock on:				Bowser Volume:	
End of Month	Jul-24	1011	Litres	2000	
Date	Aircraft Uplifts	Sample Quantity	Bulk Deliveries	Opening Balance	Closing Balance
1st	2005	5	510	366	-1134
2nd	17		2150	-1134	999
3rd			12	999	1011
4th				1011	1011

Red = Negative fuel balance

Yellow = Fuel balance is below 50% capacity

White = No issue!

1.35.1.3 At the end of the month

- a) Dip the tank and complete grid G39 on page 1 of the day in use, or appropriate grid on page 2 or 3.
- b) The Monthly Reconciliation page should be checked for missing information, and if the page is judged to be correct then close the Log.
- c) Make a copy of the completed Log and save it in the Folder created at 2 above for record purposes.
- d) Open next month's Log and enter the Serial Number, Helifuel Stock on Start of month and Installation name. When naming the saved copy use the following format - 2013-01 for January 13, 2013-02 for February 13, 2013-03 for March 13, 2013-04 for April 13 and so on.

1.36 TECHNICAL (TECH) FORMS

Tech forms used in support of fuelling operations can be found at the following locations:

[Onshore Homepage - Tech Forms - m21042021 - All Documents](#)

Location					
MONTHLY CHECK	Week Commencing	Date			
Component	Check				
Installation Storage Tank(s)	Tank shell externally for condition (damage) and integrity of protective finish. Free from leaks. All couplings & drains properly blanked. Access covers secure & sealed. Correct Fuel Grade markings in place and legible. The floating suction assembly is checked for buoyancy and freedom of movement (if visible). The dipstick is checked for condition and legibility.				
Strainers & Seals	Strainers are removed from delivery nozzles, inspected, cleaned, and refitted. Where a significant number of debris is found in strainers, the origin shall be established, and remedial action taken. Visible Seals are checked for condition.				
Hoses & Nozzles	The delivery hose is visually inspected over its full length, while subject to system pressure. Hose & Drain caps in place present and serviceable. Nozzle serviceable and clear. Nozzle bonding lead in satisfactory condition.				
Sampling Equipment	Following items available: Glass jars or Stainless Steel buckets, syringes. Shell Water Detector Capsules.				

Fire Extinguishers	Required number and type in position. Where a gauge is fitted, the indication is satisfactory.				
Name: Signature: Date:					
NOTE 1: Filter Monitor elements are replaced if the differential pressure reaches 22 lb/in2 or 1.5 bar. NOTE 2: Filter/Water Separator Filter elements are replaced if differential pressure reaches 15lb/in2 or 1.0 bar. NOTE 3: If differential pressure drops by 2lb/in2 or 0.15 bar or more since the last reading, investigation is required as it may indicate damage to the filter, allowing unfiltered fuel to pass through. In this instance, contact the Head of Ground Operations to arrange Contracted Maintenance Company repair. NOTE 4: Annual Maintenance, Filter Element Replacement & Meter Calibration Checks will be completed by a third-party fuel contractor.					
Forms are to be completed Monthly in accordance with Ground Support Manual 1.1.4.2 and 1.1.5.2. Completed Forms are to be scanned and sent to the Head of Ground Operations: Christopher.oakes@babcockinternational.com Copies will be retained for scrutiny by auditors for three years. Records will be stored on the company SMS.					

Location					
MONTHLY CHECK	Week Commencing	Date			
Component	Check				
Trailer Storage Tank(s)	Tank shell externally for condition (damage) and integrity of protective finish. Free from leaks with pump running. All couplings & drains properly blanked. Access covers secure & sealed. Correct Fuel Grade markings in place and legible.				
Trailer (General)	Pump/Motor: Oil & General Condition. Tyres: Condition Trailer Chassis: No obvious signs of damage. Battery: Condition. No signs of corrosion.				
Strainers & Seals	Strainers are removed from delivery nozzles, inspected, cleaned, and refitted. Where a significant number of debris is found in strainers, the origin shall be established, and remedial action taken. Visible Seals are checked for condition.				
Hoses & Nozzles	The delivery hose is visually inspected over its full length, while subject to system pressure. Hose & Drain caps in place present and serviceable. Nozzle serviceable and clear. Nozzle bonding lead in satisfactory condition.				
Sampling Equipment	Following items available: Glass jars or Stainless Steel buckets, syringes. Shell Water Detector Capsules.				

Fire Extinguishers	Required number and type in position. Where a gauge is fitted, the indication is satisfactory.				
Name: Signature: Date:					
NOTE 1: Filter Monitor elements are replaced if the differential pressure reaches 22 lb/in2 or 1.5 bar. NOTE 2: Filter/Water Separator Filter elements are replaced if differential pressure reaches 15lb/in2 or 1.0 bar. NOTE 3: If differential pressure drops by 2lb/in2 or 0.15 bar or more since the last reading, investigation is required as it may indicate damage to the filter, allowing unfiltered fuel to pass through. In this instance, contact the Head of Ground Operations to arrange Contracted Maintenance Company repair. NOTE 4: Annual Maintenance, Filter Element Replacement & Meter Calibration Checks will be completed by a third-party fuel contractor.					
Forms are to completed Monthly in accordance with Ground Support Manual 1.1.4.2 and 1.1.5.2. Completed Forms are to scanned and sent to the Head of Ground Operations: Christopher.oakes@babcockinternational.com Copies will be retained for scrutiny by auditors for three years. Records will be stored on the company SMS.					

1.36.3 Tech Form 096 - Fixed Installation and Bowser Replenishment Checks Record

JET A-1		Installation / Location:															
Before Replenishment									After Replenishment			After Settling					
Date	Delivery Note No	Tank No	Dip – Ullage	V	C	Colour & Appearance	Time Checked	Signature	Dip – Contents	Time & Date Tank Closed	Signature	V	C	Colour & Appearance	Time & Date Ready for use	Signature	
	Release Certificate Density @ 15°C	Measured Density	Measured Temperature	Corrected Density to 15°C	Difference in Density	Signature											

JET A-1		Installation / Location:															
Before Replenishment									After Replenishment			After Settling					
Date	Delivery Note No	Tank No	Dip – Ullage	V	C	Colour & Appearance	Time Checked	Signature	Dip – Contents	Time & Date Tank Closed	Signature	V	C	Colour & Appearance	Time & Date Ready for use	Signature	
	Release Certificate Density @ 15°C	Measured Density	Measured Temperature	Corrected Density to 15°C	Difference in Density	Signature											

V = Visual (Sediment & Free Water), C = Shell Detector Capsule Where vertical tanks are replenished by consecutive deliveries, it is not necessary to record the above checks until the last delivery is made. Send original to Babcock MCSO, Staverton fao Accounts Department. Retain copy for your records, and scrutiny by auditors for three years.																
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1.36.4 Tech Form 114 - Barrel Fuel Stock Record

LOCATION	*	*	*	*	*
OPENING STOCK (FULL DRUMS)					
USED DRUMS (WHOLE DRUMS)					
DELIVERED STOCK (DRUMS)					
CLOSING STOCK (FULL DRUMS)					
DISCREPANCY (DRUMS)					
NEXT BATCH EXPIRY DATE					
Send original to Bond Air Services Ltd., Staverton, fao Accounts Department. Retain copy for two years for your records, and examination by auditors. * ENTER SITE LOCATION NAMES AS REQUIRED					

1.36.5 Tech Form 164 – Fuel Training



FUEL TRAINING:
DAILY CHECKS & USE OF
FUELLING ASSETS

TECH FORM 164
ISSUE NO 3
AMDT NO 2
DATE Nov 2025
PAGE NO 1 OF 4

Name of Trainee:	
Name of Trainer:	
Base:	
Type of Fuelling Asset:	

Knowledge Required	Demonstrate Task	Trainee’s Signature Confirming Understanding of Training.	Date	Trainers Signature
Babcock Fuel Procedures	Refer trainee to: 1. Babcock Ground Support Manual, Part 1: Aviation Fuel Quality Manual. 2. OM-E: LBI for base in Question.			
General Familiarisation	Trainer to Familiarise Trainee: 1. Location of fuel records on company intranet. 2. Location of fuel asset keys and locks. 3. Location of fuel bowser and aircraft sample equipment 4. Location of bowser valves, fuel delivery hose locking and stop/start controls. 5. Location of fire extinguisher(s). 6. Location of Fuel Spill Kit. 7. Contingency Plan SOP including SSoW.03 Working with Dangerous and Hazardous Substances.			

Asset Operation: Starting and stopping	1. Location of the emergency STOP button. Show operation and reset. 2. Locate and open pump supply valve before starting pump. 3. Starting pump. 4. Demonstrate stop procedure (non-emergency). 5. Close pump supply valve and switch off.			
Asset Operation: Sampling References: GSM: AFQM Part 1. GSM: AFMQ Section 1.7 to 1.16). OM-E LBI	1. Refer trainee to GSM: AFQM Section 1.7 – 1.16. 2. Refer trainee to OM-E: LBI for base specific sampling routine. 3. Demonstrate Sampling routine iaw 1 & 2 above. 4. Show trainee what fuel samples should and shouldn't look like (1.10). 5. Discuss and familiarise the trainee with the Shell Detector Capsule (1.12). 6. Discuss failed fuel samples (1.13). 7. Demonstrate the Fuel Sample Retention Process (1.15). 8. Discuss Recycle or Disposal of fuel samples (1.16). 9. Refer trainee to Section 1.17 for their awareness.			
Asset Operation: Fuel Record Retention References: GSM: AFMQ Section 1.2 GSM: AFMQ Section 1.18 OM-E LBI	1. Refer trainee to Section 1.2 to detail Fuel Documentation. 2. Open Excel sheets on P: drive (1.18) 3. Click on tab for the day required. 4. Complete the fuel record.			

Asset Operation: Daily use References: GSM: AFMQ Section 1.20 – 1.24	1. Calculate required amount of fuel. Cross reference with actual fuel amount in aircraft prior to starting refill. 2. Unlock aircraft fuel cap and bowser cabinets. 3. Bond fuel asset to aircraft using bonding cable. 4. Open pump supply valve and start bowser pump. 5. Open hose supply valve and draw hose to aircraft. 6. Bond hose to aircraft and place fuel hose into fuel tank orifice. 7. Deliver fuel as required. 8. Switch on aircraft battery to check fuel contents & progress if required 9. Remove hose and then bonding lead – stow. 10. Remove bonding lead – stow. 11. Close hose supply valve. 12. Shut down pump. 13. Close pump supply valve and switch pump ignition off. 14. Note fuel figures. 15. Turn off aircraft battery, lock fuel cap & return Fuel key 16. Close cabinets. 17. Record fuel delivery as described in the above Fuel Record Retention row.			
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1.36.6 Tech Form 166 – Aircraft Towing Training



AIRCRAFT TOWING

TECH FORM 166
 ISSUE NO 1
 AMDT NO 2
 DATE Oct 2025
 PAGE NO 1 OF 3

Trainee Name	
Instructor Name	
Base of Instruction	

Subject	Task	Trainee Signature	Date	Instructor Signature
Ground Support Manual Familiarisation	Refer trainee to Ground Support Manual (GSM) Section 2 – Ground Support Equipment and introduce them to the equipment. 1. Familiarise trainee with the towing vehicle using GSM as supporting guide. 2. Familiarise the trainee with the towing frame using the GSM as a supporting guide. 3. Familiarise the trainee with the Ground Handling Wheels using the GSM as a supporting guide.			
General Demonstration	Demonstrate and Ensure trainee understands the safe and correct use of the: 1. Site Specific Hazards to Towing i.e. hangar doors, uneven floors, parking spaces etc. 2. Towing Vehicle – Practical Demo 1. 3. Ground handling wheels – Practical Demo 2. 4. Towing Frame – Practical Demo 3. 5. Recharging unit (if applicable).			



AIRCRAFT TOWING

TECH FORM 166
 ISSUE NO 1
 AMDT NO 2
 DATE Oct 2025
 PAGE NO 1 OF 3

Trainee Name	
Instructor Name	
Base of Instruction	

Subject	Task	Trainee Signature	Date	Instructor Signature
Ground Support Manual Familiarisation	Refer trainee to Ground Support Manual (GSM) Section 2 – Ground Support Equipment and introduce them to the equipment. 1. Familiarise trainee with the towing vehicle using GSM as supporting guide. 2. Familiarise the trainee with the towing frame using the GSM as a supporting guide. 3. Familiarise the trainee with the Ground Handling Wheels using the GSM as a supporting guide.			
General Demonstration	Demonstrate and Ensure trainee understands the safe and correct use of the: 1. Site Specific Hazards to Towing i.e. hangar doors, uneven floors, parking spaces etc. 2. Towing Vehicle – Practical Demo 1. 3. Ground handling wheels – Practical Demo 2. 4. Towing Frame – Practical Demo 3. 5. Recharging unit (if applicable).			

Practical Demo 1 Starting and stopping	Ensure trainee has understanding <u>of</u>: 1. Towing vehicle controls. 2. Switches. If using a separate vehicle i.e. tractor: 1. Bringing towing vehicle to tow frame. 2. Avoid trapping fingers. 3. Install towing pin. 4. Install lock pin. 5. Remove lock pin 6. Remove towing pin. 7. Move towing vehicle backwards.			
Practical Demo 2 Fitting Ground handling wheels	Ensure trainee has understanding <u>of</u>: 1. Wheel handing. 2. Attaching to the aircraft as a unit and in 2 parts. 3. Closing jacking valve. 4. Operating jack. 5. Fitting mechanical lock. Securely. 6. Releasing jack pressure for towing. 7. Close jack valve. 8. Remove mechanical lock. 9. Release jack valve slowly keeping feet clear and shout warning of lowering. 10. Remove wheels from cross tube and store with towing frame. <i>Note wheels can be left on the aircraft with skids lowered when in the hangar but always check correct installation before jacking the aircraft prior to moving.</i>			

Practical Demo 3 Fitting of towing frame.	Ensure trainee has understanding of: 1. Locking wheels to stop castering castering. 2. Position in front of aircraft. 3. Raise aircraft nose. 4. Position frame beneath cross tube. 5. Lower aircraft. 6. Secure saddle clamps. 7. Unlock wheels. 8. Locking wheels. 9. Unlocking saddle clamps. 10. Raising aircraft nose. 11. Withdrawing frame clear of aircraft – avoid antennae. 12. Lowering nose slowly.			
Towing aircraft – General Considerations	Ensure trainee understands: 1. Ballast in nose if required. 2. Use of rotor brake if required. 3. Position lights if required. 4. Movement of blades during towing. Swept blade growth when turning. 5. No more than walking pace. 6. Position and responsibility of towing personnel.			

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