ABX FUEL MANAGEMENT

ABX AIR

REVISION HIGHLIGHTS

ABX FUEL MANAGEMENT	

REVISION 25, DATED 05-21-21

Chap 01 Sect 01.01 - Fuel Specifications

Page 3, Table 2, revised maximum allowable column to “30”, per MPRR 47054.

Chap 01 Sect 07 - Fuel Servicing Procedures and Precautions

Page 2, para 1.H.(1), replaced “passenger(s)” with “personnel”, per MPRR 47054.

Page 3, para 1.H.(2)(b), replaced “passenger(s)” with “personnel”, per MPRR 47054.

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FUEL MANAGEMENT AND QUALITY CONTROL

1. General

A. Specific Regulatory Requirement (SRR's):

(1) 121.105, 121.123, 121.135(a)(1), 121.135(b)(1), 121.135(b)(17), 121.135(b)(19), 121.135(b)(2), 121.135(b)(3).

B. All fuel delivered to ABX Air aircraft must meet current ABX Air specifications and must be free from water and contamination that could affect the quality of the fuel.

C. The necessary, competent personnel and spare parts, shall be available to perform the proper fueling of the aircraft.

(1) The fuel facility and refueling equipment will be regularly inspected and checked, and will be maintained in a manner to ensure proper operation and safety to equipment and personnel.

(2) Fuel quality will be maintained by daily and periodic inspections.

(3) Records of periodic inspection will be kept by the vendor and be available upon request by ABX Air.

D. The inspection and maintenance procedures outlined are minimum test and operational procedures necessary to maintain a constant supply of clean, dry fuel of the proper specification between the source of supply and delivery into the aircraft fuel tanks.

E. The product has been manufactured to meet current acceptable industry practices and specifications.

(1) It is the objective of these procedures to ensure that these specifications are maintained until delivery into the aircraft has been completed.

(2) To accomplish this end, a system of quality control and maintenance procedures has been established:

(a) In all phases of fuel handling, appearance of jet fuel shall be clear and bright (visually free of undissolved water, sediment and suspended matter). The odor of the fuel shall not be nauseating or irritating.

(b) The color of jet fuel generally ranges from water white to light straw or amber. Other colors may be an indication the fuel has been contaminated by other products or unauthorized additives. In such cases, it will be the facility operator's responsibility to discontinue fuel transfer and/or receipt and quarantine product until fuel has been determined acceptable for aircraft use.

F. With emphasis placed on ecological control, it is imperative that suitable containers be provided for disposal of waste fuel from sump draining and sampling of product.

CAUTION: EVERY EFFORT MUST BE MADE TO MINIMIZE FUEL SPILLAGE AND IF SPILLAGE DOES OCCUR, IT MUST BE PROPERLY CONTAINED AND SUITABLY DISPOSED OF.

G. The following general responsibilities and procedures shall govern as they apply (CFR 121.123): (Ref. GRH 2.2.4)

(1) At stations where fueling is done by a contract service agency, the service agency is held responsible for the training and instruction of their personnel in the duties, procedures and precautions to be used when handling fuel and servicing ABX aircraft.

(a) ABX Air will provide the fueling procedures, including training material, and ensure that fuel and servicing procedures of the contract agency are in minimum compliance with this ABX Fuel Management Manual.

(b) The training material issued to each contract agency will be through the E-learning method using Adobe Connect software. Each employee fueling ABX aircraft must complete and pass the on-line ABX Aircraft Refueling Self-Study Program. Recurrent training must be performed every two (2) years by retaking this on-line course. Contract service agencies are responsible to schedule any and all recurrent training with ABX Air prior to expiration.

(c) Contract vendor will maintain a master list of employees showing who is trained/qualified to fuel ABX aircraft. It will be the responsibility of the vendor to notify ABX QC Department when a new employee is going to be added to the master list. ABX on-line fuel training will be set up by using the new employee's name and employee number.

(d) Facility and fueling equipment operators are responsible for ensuring that all personnel under their direction and control are properly trained and qualified for performing tasks assigned to them as specified by this ABX Fuel Management Manual. Training and qualification records are to be available for review.

(e) Contract service agencies shall notify ABX Quality Control or Fuel Administration before placing new, additional, replacement or modified equipment into service. ABX reserves the right to request copies of tests and checks performed on this equipment before it is placed into service.

(2) If ABX aircraft requires fueling at a location without a contract service agency, the Captain will ascertain that the aircraft is properly fueled in accordance with FAA and ABX requirements. The Captain may delegate supervision of the actual fueling operation to the First Officer, where appropriate (ref. Flight Operations Manual, Chapter 4, page 2).

(3) The contract service agency shall have a policy and procedures manual (P&P), or a current copy of ATA 103 Spec. The purpose of the manuals is to provide operational guidance to management and staff. These manuals shall be kept current and shall be readily available to employees and to the customer's auditor or designee. The P&P manual shall include, but not necessarily be limited to, a detailed description of:

(a) General

1 Responsibility

A There is a clearly identifiable, qualified and knowledgeable person who is accountable for the quality of a process.

2 Authority

A There is a clearly identifiable, qualified and knowledgeable person with the authority to establish and modify a process.

3 Procedures

A There are documented methods for accomplishing a process.

4 Controls

A There are checks and restraints designed into a process to ensure a desired result.

5 Process Management

A The vendor measures and assesses their process to identify problems or potential problems.

6 Interfaces

A The vendor identifies and manages the interactions between processes.

7 Quality Program

(b) Operations

1 Receipts

2 Transfers

3 Storage

4 Dispensing

5 Handling contaminated fuel and customer notification.

6 Notifying customers/Quality department when new, additional, replacement, or modified equipment is placed into operation.

7 Notifying customers/Quality department of inoperative systems that impact operations.

8 Defueling procedures.

9 Reporting of observed deficiencies or safety hazards.

10 Inspection Program.

11 Quality control and maintenance record keeping requirements and record retention time.

12 Fuel meter and tool calibration program.

13 Training Program.

14 Technical data program, e.g. quality control, maintenance and air carrier manuals.

15 Required tests to ensure fuel meets quality specifications.

(c) Environmental

1 Spill Prevention Control & Counter Measure Plan (SPCC) and/or facility response plan must be certified every 5 years.

2 Emergency Information

A Contact list.

(4) A variance or waiver to the policies and procedures in this ABX Fuel Management Manual that will not compromise fuel quality, safety or security may be granted. A request for variance or waiver must be made in writing to Fuel Management and each affected airline, and shall include the following:

(a) Requirement from which the variance or waiver is being requested.

(b) Explanation as to why compliance with this ABX Fuel Management Manual requirement is not possible or practical.

(c) Alternate means of compliance to be considered for approval of request.

(d) Period of time for which variance or waiver is to be effective (if indefinite, it should be labeled as, “indefinite”).

1 The vendor will maintain the written waiver approval on file as long as it is effective.

H. International Aircraft Fueling Standards

(1) The Joint Inspection Group (JIG), International Fuel Companies, and Government Agency Fueling Standards use are acceptable to ABX. The standard will be verified for compliance during ABX audit.

I. Military Fueling Standards

(1) DOD Fuel Standards used by military bases are acceptable to ABX Air. ABX Fuel Audits will not be accomplished at these bases.

(2) 767 Aircraft Refueling On-Line Training Course is not required.

(3) Water/Contamination check prior to aircraft fueling begins. Log book entry required.

(4) Review DLA website for approved fuel stations.

J. Fuel Contamination

(1) If visible contamination of fuel is observed or found, aircraft refueling must be discontinued from that source. Notify all affected aircraft operations if it is anticipated that such contamination might impact operations. Fueling shall not be resumed from the system until the source of fuel contamination is found and removed.

(2) Fuel, suspected of possible contamination, shall be held in quarantine until selected fuel quality, purity or specification tests have determined that it is acceptable for aircraft use. Selected product tests and expected acceptance criteria are to be determined and mutually agreed upon by fueling vendor and all affected customers prior to approving fuel for future use. To the extent the fuel is no longer acceptable for aircraft use, it

should be managed and/or disposed consistent with applicable federal, state and local requirements.

K. Defueled Product

(1) Product defueled from an aircraft for purposes other than contamination should be returned to the airline from which it was removed. Defueled product may not be delivered to another airline's aircraft without their approval. Defueling aircraft directly into joint use fueling systems is not authorized unless all system users have unanimously approved a joint use procedure.

(2) After defueling, and prior to uploading the defueled product, allow the fueling vehicle to settle for 10 minutes then drain at least one gallon of fuel from the tank sump(s) into a suitable container and perform a visual inspection. Remove unit from service if unable to clean, dry fuel after three samples have been drained.

L. Inoperative System

(1) If for any reason a fueling system becomes inoperative so as to impair normal refueling operations, all affected airlines must be notified immediately.

M. Deficiency Reporting

(1) The facility and equipment operator shall establish written procedures for the reporting of any observed deficiencies or safety hazards by its employees to their supervisors.

N. Operations and Maintenance Manuals

(1) All airport fueling vendors having aviation fuel storage facilities and/or aircraft refueling equipment administrative and operational responsibilities should have operations and maintenance (O&M) manuals, These documents are intended to be used by fuel handling vendors and equipment operators to help ensure the safe and dependable flow of quality fuel to aircraft. Guidance on the development of a site-specific O&M manual can be found in the ATA "Airport Fuel Facility Operations and Maintenance Guidance Manual".

O. Prevention of Misfuelings

(1) Measures are required to ensure that the correct grade of fuel is delivered when using an overwing (trigger) nozzle. Delivering the wrong grade of fuel into an airplane is termed a “misfueling.” It is essential that tight control procedures are in place at all times to avoid misfueling.

(2) The risk of delivering the wrong grade of fuel exists because many General Aviation (GA) aircraft and some airline type aircraft are overwing fueled and can therefore potentially be fueled with the wrong grade of fuel.

(3) The serious consequences of misfueling include:

(a) Total engine failure due to knock damage if jet fuel is delivered into a spark ignition piston engine powered aircraft that requires avgas.

(b) Ignition failure if avgas is delivered into a compression ignition (diesel) piston engine powered aircraft that requires jet fuel.

(c) Vapor lock and engine failure due to fuel starvation if avgas is delivered into a turbine engine powered aircraft that requires jet fuel. 0

NOTE: Many turbine engines are capable of operating on avgas, but such operation is strictly controlled as described in the Pilot Operating Handbook.

(4) The facility and equipment operator shall establish written procedures for overwing fueling.

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FUEL SPECIFICATIONS

1. Fuel Specifications for Aircraft Operated by ABX Air, Inc. (Ref. ATA Spec 103, Ch. 02-02)

   NOTE: Maintenance Control must be notified prior to fueling if an alternate or emergency fuel is going to be used. (Ref. GRH 4.1.1)

   A. B767

      (1) Fuel must conform to jet fuel specification ASTM-D-1655, Jet A, Jet A1.

2. Upstream Jet Fuel Purity and Specification Parameters

   A. The following jet fuel purity and specification parameters should apply "upstream" of airport receiving filtration.

Table 1: Jet Fuel Purity and Specifications Parameters

Test Property	Maximum Allowable	Test Method
Appearance	Clear & Bright	Visual Ref. [ATA Spec 103, Section 3-1]
Density (API Gravity)	37° to 51° API (775-840 Kg/m^3) Corrected to 60° F (15° C)	[ASTM D1298] Metric measurement shall be used in event of dispute (775-840 Kg/m^3)

NOTE: It is important that the facility operator assigned the task and responsibility to receive jet fuel into airport storage tanks sample inbound deliveries upstream of receiving filtration for potential contamination or excessive water/dirt levels. Inbound jet fuel purity shall permit reasonable receiving filtration system performance and service life. Upstream appearance ratings less than Clear & Bright may indicate excessive contamination levels which could result in shortened receiving filtration life and may increase operational costs. Unacceptable operational and economic issues based on upstream jet fuel purity levels are to be resolved between applicable shipper, facility operator, and/or customer.

3. Downstream Jet Fuel Purity and Specification Parameters

A. The following jet fuel purity and specification limits shall apply “downstream” of the receiving and dispensing filtration as:

(1) Received into airport storage tanks and dispensed from airport storage facilities which will issue product directly to hydrant systems and to aircraft refueler loading racks.

(2) Dispensed into aircraft.

NOTE: See rejection criteria in reference NOTES or in [ATA Spec 103, Section 2-3] for applicable transportation methods.

Table 2: Downstream Jet Fuel Purity and Specification Limits

Test Property	Maximum Allowable	Test Method	See Notes
Free Water	30 PPM	Ref. [ATA Spec 103, Section 3-3]	
Particulate Color*	A, B or G 2-Dry or A, B or G 3-Wet	[ASTM D2276]	1
Particle Assess-ment*	A	Visual	2

*Sample sizes are either 1 Gallon or 3.78 Liter.

NOTE 1:
A color rating of 3-DRY or greater may indicate a particulate contaminant problem. If a color rating of 3-DRY or greater is observed, proceed as follows: Perform a subsequent particulate test consisting of two membranes in a plastic holder to compare color differences between top and bottom membranes. If top and bottom membranes have a color rating difference of 2 or less, fuel is to be considered clean and acceptable. If difference is 3 or greater, conduct a gravimetric (weight) analysis. Fuel is unacceptable if gravimetric test [ASTM D2276] results exceed 2.0 mg/G or 0.5 mg/L based on test sample size taken.

NOTE 2:
An assessment rating of “B” or greater indicates that solid particles are visible on the test membrane or in the sample container. This observation may be an indication that there is generation of contamination in system or failure of filtration upstream of sample test connection. Particle Assessment is an aid in communicating visual observations of size and distribution of solids as they appear on test membranes or the bottom of sample containers.

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FUEL DELIVERY PROCEDURES

1. Receiving Fuel (REF. GRH 4.1.1)

A. This section covers quality control and safety requirements for receiving jet fuel into airport storage. These requirements can vary depending on method of delivery and facility layout.

(1) Receipts of jet fuel at airports are normally made by dedicated or multi-product pipelines and highway transport trucks. There are some airports receiving product directly from railroad tank cars or marine vessels.

(2) It is important that the facility operator recognizes that each of these transportation methods has different delivery requirements and that they be addressed in local receiving procedures to ensure fuel quality and safety.

B. Fuel delivered to ABX/Vendor refueling storage facilities must be checked for quality and quantity before it can be accepted.

C. Airports can receive product from tanks with stratification indicated by API gravity differences of greater than 1 degree between an upper, middle, and lower samples provided the following tests are done prior to release.

(1) API gravity, Initial boiling point, Flash point, and End boiling point. These tests shall be conducted on each of the upper, middle and lower samples.

(2) The values shall not exceed the specification limits

(3) These tests results shall be provided and communicated to the airport prior to release along with the C of A.

(4) During receipt at the airport the required API gravity checks shall be within the upper and lower ranges of the values documented on the upper, middle and lower samples.

(5) This shall also apply for tanks on the airport which are dedicated to receipts only from a multi- product pipeline.

D. Accepting fuel by transport (truck) delivery. (Ref. ATA Spec 103, Ch. 2-3, Item 3)

CAUTION: STAINLESS STEEL BUCKETS ARE NOT TO BE USED FOR WHITE WHITE BUCKET TESTS FOR TRANSPORT TRUCK DELIVERIES. THE COLOR OF DYES CANNOT BE SEEN IN THIS KIND OF CONTAINER

CAUTION: UNDER NO CIRCUMSTANCES IS IT ACCEPTABLE TO RECEIVE AND DISPENSE FUEL FROM THE SAME TANK SIMULTANEOUSLY.

NOTE: All records of receiving and inspection tests and checks must be recorded on an ATA form number 103.02 or equivalent.

(1) The receiving tank should be gauged (prior to delivery) to verify there is sufficient room in the tank to hold the fuel.

(a) Gauging may be done:

1 Manually with a plumb-bob tape,

2 Manually with a measuring stick,

3 Using a calibrated gage installed on the tank,

4 Using a computerized gauging system.

(2) The receiving tank drains shall be checked to ensure sumps are free of water and other contaminants, on a daily basis.

(3) All valves should be set correctly for receiving fuel.

NOTE: Prior to testing and the unloading of a Transport Truck, allow truck to set for a minimum of 10 minutes with the tank internal valves open.

(4) An API gravity test shall be performed at the time of each delivery. API gravity must be from 37 through 51 degrees, corrected to 60 degrees F on transports. The “observed” API gravity shall be recorded. This will then be compared to the shipping document API gravity.

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CAUTION: FUEL IS UNACCEPTABLE AND MUST BE REJECTED IF API.GRAVITY, CORRECTED TO 60 DEGREES F (15 DEGREES C), IS NOT BETWEEN 37 DEGREES AND 51 DEGREES API DISCONTINUE FUEL TRANSFER OR RECEIPT AND INITIATE AN MMEDIATE INVESTIGATION TO DETERMINE IF THERE IS FUEL CONTAMINATION OR A SPECIFICATION PROBLEM IF THERE IS A CHANGE OF MORE THAN 1 DEGREE API FROM SOURCE, AS SHOWN ON SHIPPING DOCUMENT. (Reference 1. C. of this section.)

(5) A suitable method of bonding the vehicle to the storage facility should be provided and attachment made prior to unloading the fuel.

(6) At time of delivery and prior to connecting truck discharge hoses, transport truck driver and facility operator are to review and agree that fuel delivery documentation and procedures are in place.

(a) To ensure satisfactory fuel receipt, shipping document shall include all delivery information, (i.e., destination, batch number, fuel grade or type, quantity to be shipped, and API gravity corrected to 60 degrees F (15 degrees C).

(b) Any question as to the grade of fuel received should be coordinated through the immediate supervisor prior to unloading.

(7) Anti-tamper seals are not required for all vendors. All compartments and outlet valves should be checked to ensure that all seals are intact, if required.

(a) If seals have been removed or are missing, notify the immediate supervisor.

(b) Before connecting the unloading hose, a Visual Appearance test (in accordance with the method outlined in this procedure) shall be made of the first draw-off from each compartment. Record the overall results.

(c) Use extreme care and vigilance when performing the Visual Appearance test. Slight traces of water, solids or color may indicate the presence of product mixes or other contaminants that could cause jet fuel to be off-specification and unacceptable for aircraft use. Any unusual results must be investigated.

(d) Fuel should be rejected if not acceptable after the fifth one-gallon sample is taken. However, if, in the operator's judgment, it appears that the sample quality is improving with each subsequent sampling, the operator can elect to continue sampling until a clear and bright sample is obtained.

(8) Inspect unloading hose for protective cover and absence of contaminants prior to making connection.

(9) If the hose is found to contain excessive contaminants, do not unload fuel until the hose is either thoroughly cleaned or replaced with one which is acceptable.

(10) While receiving fuel into airport storage, facility operator is to periodically monitor pressure differential of inlet filtration and check system for product leaks.

(11) Upon completion of fuel receipt into airport storage, facility operator shall secure receiving tank(s) and facility items, (i.e., gauging, record results of sumping tanks and filter, set inlet and outlet valves for correct positioning, etc.). Tank and filter sump result records are to be retained for 12 months.

NOTE: For receiving tank sumping, minimum of one hour settling time between the end of transport truck receiving and storage tank sumping is recommended to allow any water and/or solids stirred up during tank receiving to settle to the tank sump for removal.

(12) All operators who supply fuel to ABX Air aircraft will check the fuel received in accordance to the above procedure.

E. Accepting fuels by pipeline delivery. (Ref. ATA Spec 103, Ch. 2-3, Item 2)

CAUTION: THE FACILITY MUST NOT BE LEFT UNATTENDED AT ANYTIME DURING THE DELIVERY.

(1) Facility operator shall prepare receiving tank(s) and facility items prior to delivery of product (i.e., gauging, sumping, correct inlet and outlet valve positioning).

CAUTION: UNDER NO CIRCUMSTANCES IS IT ACCEPTABLE TO RECEIVE AND DISPENSE FUEL FROM THE SAME TANK SIMULTANEOUSLY.

(2) Prior to delivery, airport facility operator must receive a shipping document from jet fuel supplier or shipping agent, certifying product to be delivered to airport meets proper industry specifications and requirements.

(a) Shipping document shall include all delivery information; destination, batch number, fuel grade or type, and quantity to be shipped.

(3) Coordinate communications between pipeline shipping and facility receiving personnel to ensure applicable documentation, notifications, and procedures are in place to provide satisfactory fuel receipt.

(4) At the beginning, at mid-point and near the end of the delivery, a Visual Appearance Test, API Gravity Test, Color Membrane Test, and a Free Water Detection Test shall be performed and recorded.

CAUTION: STAINLESS STEEL BUCKETS ARE NOT TO BE USED FOR WHITE WHITE BUCKET TESTS FOR TRANSPORT TRUCK DELIVERIES. THE COLOR OF DYES CANNOT BE SEEN IN THIS KIND OF CONTAINER.

NOTE: The mid-point test may be omitted on shipments of less than 4 hours in duration.

(a) If the product does not pass the tests, the receiving tank must be quarantined pending further investigation.

(5) Fuel is unacceptable and must be rejected if API Gravity, corrected to 60 degrees F (15 degrees C), is not between 37 and 51 degrees API and/or Flash Point is less than 100 degrees F (38 degrees C).

(6) Discontinue fuel transfer or receipt, and initiate an immediate investigation to determine if there is fuel contamination or a specification problem if there is a change of more than 1 degree API or 5 degrees F (3 degrees C), in Flash Point from source as shown on shipping document. (Reference 1. C. of this section)

(7) While receiving fuel into airport storage, facility operator is to periodically monitor pressure differential of inlet filtration, tank fill levels and check system for product leaks.

(8) Upon completion of fuel receipt onto airport storage, facility operator shall secure receiving tank(s) and facility items, (i.e., gauging, record results of sumping tanks and filter, set inlet and outlet valves for correct positioning, etc.).

NOTE: All records of receiving, inspection tests and checks, must be recorded on an ATA 103.3 form or equivalent.

NOTE: To help improve fuel purity, it is desirable to have one hour settling per vertical foot of product depth.

F. Accepting fuels by railroad tank car.

(1) Airport facility operators should follow paragraph 1.D. for guidance procedures.

G. Accepting fuels by marine vessels.

(1) Airport facility operator should follow paragraph 1.E. for guidance procedures.

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FUEL STORAGE FACILITY

1. General (Ref. ATA Spec 103, Ch. 2-4) (Ref. GRH 4.1.1)

   A. All fuel shall receive a minimum of two (2) filtration/separation processes before delivery into the aircraft. The arrangement and management may differ in each facility installation. The following guide shall be used for each type facility.

      (1) Storage with dispensing directly to aircraft: Fuel shall be processed through filter/separator when going into storage and again when it comes out of storage and is dispensed into aircraft.

      (2) Fuel dispensed into an aircraft from a refueler shall pass through filter/separator coming out of storage and again through a filter/separator from the refueler into the aircraft.

      CAUTION: UNDER NO CIRCUMSTANCES IS IT ACCEPTABLE TO RECEIVE AND DISPENSE FUEL FROM THE SAME TANK SIMULTANEOUSLY.

      (3) Fuel facilities which store more than one product shall be designed to ensure positive product segregation. Plumbing and above ground appurtenances shall be identified with proper color coding and placarding at or near the fill point of the system in accordance with API standards. Connections for receiving and dispensing different grades of fuel must be physically incompatible.

   B. Storage Tanks

      CAUTION: ANY LEAKING OR MALFUNCTIONING EQUIPMENT SHALL BE REMOVED FROM SERVICE IMMEDIATELY UPON DISCOVERY.

      (1) Storage tanks shall include the following equipment:

         (a) Floating suction with means of verifying proper operation.

         (b) Inlet diffuser.

         (c) Access manway.

         (d) Automatic high liquid level device(s) to prevent tank overfill.

(e) Gauge hatch with slotted tube.

(2) Above ground vertical tanks shall also include the following equipment, in addition to paragraph 1.B.(1).

(a) Fixed roof.

(b) Cone down bottom to positive center sump with drain.

(c) Nonmetallic tanks are not acceptable.

(d) Light color epoxy coated floor and sides up to the first wall panel. Complete internal coating is recommended.

(3) Above ground horizontal tanks shall also include the following equipment, in addition to paragraph 1.B.(1)

(a) Carbon steel tanks must have complete internal light colored epoxy coating.

(b) Access manways should be equipped with an internal ladder.

(c) Nonmetallic tanks are not acceptable.

(d) Sloped bottom to positive sump with drain.

(4) Underground tanks shall also include the following equipment, in addition to paragraph 1.B.(1) above, unless otherwise indicated.

(a) Carbon steel tanks must have complete internal light-colored epoxy coating.

(b) Access manways should be equipped with an internal ladder.

(c) Sloped bottom to positive sump with permanent pump fixture.

(d) Manways and other subordinate parts must extend above ground where possible.

C. Filters

(1) All filter/separators must meet the requirements of API 1581, Group II, Class B, latest edition or be qualified by similarity. If qualified by similarity, a qualification report must be maintained locally and a data plate reflecting such qualification must be attached to the vessel.

NOTE: Failure to meet the requirements of line (g) on the Similarity Data Sheet shall not be a criteria for rejecting the filter vessel at existing installations.

(2) Filter/separators must be equipped with automatic water defense systems which will stop fuel flow or alert operating personnel when actuated by a high water level. Water defense systems must include provisions for an operational test.

NOTE: Full-flow monitors meeting the requirements of IP "Specifications and Qualifications Procedures-Aviation Fuel Filter Monitors With Absorbent Type Elements", latest edition, may be used in lieu of filter/separators with water defense systems. If installed, there must be at least one new set of filters available.

(3) Existing full-flow monitors of fuel facilities must be replaced within 1 year from the date of ATA 103 revision 2009.1.

(4) All filter vessels must be equipped with the following:

(a) Air eliminator devices.

(b) Direct reading differential pressure gauge.

(c) Manual sump drains.

(d) Upstream and downstream sampling connections (probes with proper flow direction and caps or plugs).

(e) Pressure relief valves.

(f) Placard indicating month and year of last filter change.

(g) Manufacturers assembly placard which displays number and type of Coalescer Elements and Separator Elements, or similarity placard.

D. Emergency Fuel Shut-off Systems

(1) Each emergency fuel shut-off station shall be placards, “EMERGENCY FUEL SHUTOFF” in at least two inch letters and clear of obstructions.

(2) Method of operations shall be indicated by an arrow or by the word “PUSH” or “PULL”, as appropriate.

E. Static Bonding

(1) Static bonding connections must be provided between truck and fill stand or download points.

F. Fire Extinguishers

(1) Fire Extinguishers with inspection tags must be available and properly mounted, so that they are easily accessible from the ground.

(2) Inspection Tags

(a) Inspection tags which indicate the month and year inspections, maintenance, and recharging were performed and identity of person performing the inspection must be attached to the bottle.

(b) A bar coding inspection tag system may also be used instead of paper inspection tags. A bar code tag is attached to the bottle which identifies the firebottle. The initial inspection and maintenance history of firebottle is loaded into a database. During inspection of the firebottle the tag is scanned and the inspection performed is entered into scanner which is downloaded into database/computer. A computer-generated printout can be produced which details the entire inspection and maintenance history of the extinguisher.

G. Fuel Loading Hoses

(1) All fuel loading hoses must be compatible with jet fuel and properly labeled.

H. Identification Signs

(1) “NO SMOKING”, “FLAMMABLE” and product identification signs must be prominently displayed, including flow direction.

I. Refueling Truck Loading Station

(1) A handheld deadman control device is required for all truck loading operations, per NFPA 407. Bottom loading control systems do not negate the need to bond with a separate bonding cable.

(2) Loading station must be equipped with pressure control provisions, if necessary to prevent damage to the refueling truck during high level shutdown of truck mounted valves.

(3) All stations must be equipped with static bonding capability.

(4) Bottom-loading nozzles and couplers must be equipped with 60 mesh or finer screens These screens are not required, if an upstream strainer is installed and no hoses are used between the strainer and the nozzle/ coupler, i.e., “swing arm” applications.

(5) Fire extinguishers with inspection tags must be positioned in accordance with applicable safety requirements.

(6) Hoses and hose couplings must meet the following standard when purchased by the end user:

(a) [API 1529], Grade 2, Type C, latest edition

(7) Hoses shall be installed within 2 years of the date of manufacture, and have a maximum service life of 10 years from the date of manufacture.

(8) Dust covers or other protective devices, must be used to prevent debris from accumulating on mating surfaces of fuel loading hose couplers.

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ABX FUEL MANAGEMENT	REV. NO.: 23 DATE: 05-03-17

INSPECTION AND MAINTENANCE (REF. GRH 4.1.1)

1. General

A. Inspection procedures of all fueling facilities operated on behalf of ABX Air, Inc. will be the responsibility of the individual vendor and be monitored by ABX Quality Control.

(1) Upon completion of a fuel facility and dispensing equipment inspection, the inspection forms will be reviewed by ABX Quality Control to resolve discrepancies, if any, noted during the inspection.

B. Contract fuel service agencies will be held responsible to:

(1) Keep their storage facility and dispensing equipment in satisfactory operating condition in accordance with ABX Fuel Management Manual and/or ATA 103 specification as applicable.

(2) Instruct their employees in those policies, procedures, and precautions to be taken in handling fuel. The records of that instruction will be available for review.

C. Each vendor shall make certain the established periodic and equipment checks have been made according to ABX Fuel Management Manual and/or ATA 103 standards as applicable, and that it is properly recorded on ATA 103 forms, or equivalent.

D. Exposure to fuel contamination from new, reworked or repaired equipment during the initial fueling process necessitates some very rigid standards and procedures be established; therefore, the following shall apply:

(1) Before any new, supplemental or replacement refueler or storage facility can be put into service at any regular refueling station, it shall be thoroughly inspected and tested. The filter change date must be within limits. Circulate a minimum of 2000 gallons through the system and accomplish a Millipore test.

(2) Anytime a refueling truck is moved from one location to another location or anytime any maintenance, repair, redesign or parts replacement is accomplished on the fueling system or anytime a fueling hose is replaced, circulate a minimum of 2000 gallons through the system. Accomplish necessary checks and tests as outlined by this Standard Practice before the fueling system may be used to service ABX aircraft.

(3) All dispensing equipment used to fuel ABX aircraft must operate within design limits for the aircraft fuel system. The established limits for fueling ABX Air, Inc. aircraft are as follows:

(a) Effective fuel pressure at the aircraft adapter shall not exceed 50 PSI, preferably 35 PSI. This pressure is taken at the adapter or after the fuel passes the venturi. Most dispensing equipment does not have gages to read this pressure (do not confuse this pressure with operating pressure or filter pressures); however, this pressure is established by adjusting or sizing the venturi when equipment is first put into operation and will remain the same as long as operating pressures do not change.

(b) Master gauges, multi-meters, and torque wrenches are required to be calibrated annually. Laboratory test equipment used to verify conformance to applicable specification are required to be calibrated annually or at the frequency mandated by the applicable test method or manufacturer specifications, whichever is less. Calibrations are required to be performed by a company that uses standards whose accuracies are traceable to the National Institute of Standards and Technology (NIST) and in compliance with ANSI/ NCSL Z540-1 standards. A Calibration Certificate shall be provided.

(c) Anytime adjustment or sizing of the venturi would change, or the nozzle pressure gauge is changed, a calibrated master pressure gauge shall be used to verify the operating pressure and gauges are operating within correct limits.

(d) Refueling truck operating pressure shall not exceed 50 PSI.

(4) Notification

(a) For problems relating to fuel servicing, contact the following at ABX Air, Inc., 145 Hunter Drive, Wilmington, OH 45177 (937) 382-5591.

1 Maintenance Control

2 Fuel Management

3 Quality Control

2. Fuel Facility Checks

A. Records

(1) Records, paper or electronic, must be completed by the person performing the tasks, or by the person accepting responsibility for performance of the tasks.

(2) Use of Forms 103.01, A through D, is recommended, but not required. No variance authority is needed to use other forms if they meet or exceed the task and frequency requirements specified in this section. Additional copies of Forms 103.1, A through D, may be reproduced locally (Ref. ATA Spec 103, section 6-2).

(3) The legible signature, initials or employee identification number of the person performing the tasks or the person accepting responsibility for the performance of the tasks is required.

(a) If initials or employee identification numbers are used, a record of each person's name and initials/identification number must be maintained and available for review.

(b) Supporting documentation, completed by the person actually performing the tasks and containing their signature, initials or identification number must be available if another person has accepted responsibility for accomplishment of the tasks.

(4) Records must indicate when fueling equipment is not used. Retain records in local files as follows:

(a) Daily, Monthly, Quarterly, Semi-Annual, and Annual check records - 12 months.

(b) Filter Change records - 36 months.

(c) Tank Inspection and Cleaning records - Indefinitely.

(5) Upon completion of the checks, record results using the following condition codes:

S = Indicates Satisfactory

C = Indicates Comment. Comment required in remarks section. Corrective action must be documented and dated

N/U = Indicates unit Not Used

N/A = Indicates Task Not Applicable

Sump samples are to be rated according to [ATA Spec 103, section 3-1].

B. Daily Checks

(1) General Condition of Tank Yard

(a) Check the general condition of the yard area for appearance and cleanliness. Report and correct any condition that needs immediate attention, i.e., plugged drainage, weeds, poor housekeeping, etc.

(b) Evidence of any recent fuel spill, including, but not limited to, staining, strong fuel odors or the presence of fuel in catchment basins, overflow tanks, oil/water separators, or sumps, must be investigated immediately.

(2) Security, Fire & Safety Deficiencies

(a) Check tank yard and fuel handling facilities for any security, fire or safety deficiencies or unusual conditions requiring immediate corrective actions.

(b) Fuel Leaks

1 Check tanks, piping, valves, hoses, meters, filters, and other fuel handling equipment for fuel leaks.

2 Any visible leaks must be immediately reported and repaired.

(c) Ensure that all gates and access doors are kept locked when area is unattended.

(d) All broken fences and gates are to be repaired or replaced immediately.

(e) In unsecured areas, all tank openings, valves, sump drains, fill caps, monitoring ports, loading/unloading hoses, master electrical switches and other accessible fittings must be kept closed and locked at all times when not in use.

(3) Storage Tank and Product Reclamation Tank Sumps

(a) Drain fuel, at maximum practical flow, into suitable container (Ref. [ATA Spec 103, section 3-1]). Sample quantity shall be of sufficient size to ensure displacement of sampling line volume.

CAUTION: IF A PLASTIC CONTAINER IS USED FOR AN APPEARANCE TEST, IT SHALL BE EQUIPPED WITH STATIC BONDING CAPABILITY.

(b) Perform fuel appearance test of sample.

(c) Record finds of first sample taken, after displacement of sampling line volume, according to [ATA Spec 103, section 3-1].

(d) Continue draining until clean, dry fuel is obtained.

(e) Remove tank from service if unable to obtain clean, dry fuel. Report unusual contamination to aircraft operators if it is anticipated that such contamination may impact aircraft operations.

(4) Filter Sumps

(a) Drain fuel, at maximum practical flow, into suitable container (Ref. [ATA spec 103, section 3-1]). Vessel must be pressurized, but fuel does not have to be flowing through vessel when sample is taken.

CAUTION: IF A PLASTIC CONTAINER IS USED FOR AN APPEARANCE TEST, IT SHALL BE EQUIPPED WITH STATIC BONDING CAPABILITY.

(b) Perform fuel appearance test of sample.

(c) Record findings of first sample taken, after displacement of sampling line volume, according to [ATA Spec 103, section 3-1].

(d) Remove filter vessel from service if unable to obtain clean, dry fuel. Report unusual contamination to aircraft operators if it is anticipated that such contamination may impact aircraft operations.

(5) Filter Differential Pressure

(a) Under normal flow conditions, check and record differential pressure across all working filters (Ref [ATA Spec 103, section 3-9]).

(6) Hoses, Swivels, Nozzles & Couplers

(a) check condition of all fuel hoses, swivels, nozzles and couplers for war, damage and leakage.

(b) Ensure dust covers or other protective devices are available, installed and in good repair.

1 Check hoses for abrasions, cuts, soft spots, carcass separation, worn covers, blisters, exposed reinforcement, cracks, twists and sharp bends that give the appearance of pending failure.

2 Check tightness of all swivel attachment screws and hose couplings.

3 Check condition of nose and poppet seals on nozzles/ couplers for cuts, nicks and wear.

(c) Any item that is defective or is leaking must be replaced or repaired immediately.

(7) Static Reels, Cables & Clamps

(a) Check condition of static reels, cables and clamps.

(b) Any defect that affects continuity must be corrected prior to use.

NOTE: Continuity must be check after maintenance to static bonding systems.

(8) Fire Extinguishers

(a) Verify that fire extinguishers:

1 Are located in their designated place.

2 Have unobstructed access and visibility.

3 Are tagged to indicate monthly inspections are current.

4 Have unbroken safety seals or tamper indicators.

5 Have no obvious physical damage, corrosion or leakage.

6 When so equipped, the pressure gauge reading or indicator is in the operable range or position.

(b) If any fire extinguisher is missing or does not meet the criteria listed above, it shall be repaired, or removed from service and replaced with a serviceable extinguisher of the same or greater capacity.

C. Monthly Checks

(1) Filtration & Free Water Test (Millipore)

(a) Perform a membrane color/particle (Millipore) simultaneously, under flow, upstream and downstream of each filter/separator and monitor vessel.

(b) Perform a free water test downstream of each filter/separator and monitor vessel.

(c) Record results and attach test membrane to Form 103.08 or equal (Ref. [Section 3-2] and [Section 3-3]).

(2) Corrected Filter Differential Pressure

(a) Under normal flow conditions, check and record observed differential pressure, flow rate, and corrected differential pressure across each working filter.

(3) Bonding Cable Continuity

(a) Perform electrical continuity check on binding cables and clamps (Ref. ATA Spec 103, section 3-10]).

1 Resistance must be 25 ohms or less.

2 Defective equipment must be repaired prior to fuel transfer.

NOTE: On loading racks equipped with combined bonding and overfill protection systems, operator must check resistance between appropriate system connection point and facility pipe work.

(4) Nozzle Screens

(a) Remove nozzles and examine screens for particles or damage.

1 If particles are found, investigate sources of contamination which could be from inner hose lining, pipe rust, sand, low point sediment, equipment failure, seals, gaskets, etc. and take appropriate action

(b) Screens are to be cleaned if contaminated or replaced if damaged.

(5) Signs, Labels & Placards

(a) Verify that fueling equipment is clearly marked with the proper type of fuel being dispensed, flammable, no smoking, emergency shutoff and other appropriate information and instructions, signs or labels as required.

(6) Floating Suctions

(a) Verify satisfactory operation of all tank floating suctions.

(7) Fire Extinguishers

(a) Check each fire extinguisher for inspection tag and seal.

(b) Maintain extinguishers in accordance with the applicable [NFPA 10] guidelines.

(c) Upon completion of the inspection, update inspection tag.

D. Quarterly Checks

NOTE: A minimum of 60 days must elapse between quarterly checks.

(1) Emergency Shutoff system

(a) Operationally check the emergency shutoff system.

1 Coordinate shutoff test with all persons, agents, airlines, fuel suppliers, and other groups having interest in the operation of the system.

2 Each control device must be tested at least once a year.

(b) Immediately report any operational discrepancies.

(2) Water Defense System - External Checks

(a) Check operation of water defense systems in accordance with quarterly requirements of [ATA Spec 103, section 3-12].

(3) Tank High Level Controls

(a) Check satisfactory operation of tank high level sensing devices and automatic fuel flow shutoff valves where installed.

(b) Inoperative controls should be adjusted or repaired immediately or have alternate operating procedures in effect that will provide positive spill prevention while tank is in service.

E. Semi-Annual Check

(1) Hose Pressure Checks

(a) Loading/unloading hoses fitted with reusable couplings, and being operated under system pressure, must undergo the six-month pressure testing at 225 PSI, per the requirements found in [API/IP 1540].

NOTE: Pressure testing to 300 PSI is required whenever a new hose attachment or coupling is fitted.

CAUTION: RECOUPLING AND PRESSURE TESTING OF HOSES AND FITTINGS SHOULD ONLY BE CARRIED OUT BY PERSONS ADEQUATELY TRAINED IN THEIR PROPER FITTINGS AND TESTING, AND APPROVED BY THE OEM.

F. Annual Checks

(1) Storage Tank Interiors

(a) Check fuel storage tank interiors for cleanliness and condition coating.

(b) Clean as required ([Ref. ATA Spec 103, section 3-11]).

(2) Filter Differential Pressure gauges

(a) Verify proper operation of filter differential pressure gauge(s) in accordance with gauge manufacturers' procedures. Repair or replace as required ([Ref. ATA Spec 103, section 3-9]).

(3) Filter elements

(a) Change filter elements per ([Ref. ATA Spec 103, section 3-13]).

(b) Replace filter elements per criteria found in ([Ref. ATA Spec 103, section 3-14]).

(c) All filter vessels must be opened annually to visually check condition of interior for cleanliness, and integrity of elements.

(4) Filter/Separator Heaters

(a) Where installed, check filter/separator sump and drain line heaters for proper operation per manufacturer specifications before freezing weather.

(5) Tank Vents

(a) Where installed, check cleanliness of tank vent screens.

1 Clean, repair or replace vent screens as required.

(b) Tanks that have pressure/vacuum vents, check satisfactory operation and condition of poppets and inlet screens.

1 Under freezing conditions, additional checks may be required to assure free movement of poppets.

(6) Cathodic Protections

(a) Where installed, confirm satisfactory operation of cathodic protection systems. This requirement is generally contracted to businesses specializing in this type of service. State or local regulations may require greater frequency of inspection.

(7) Line Strainers

(a) If installed, check line strainers for cleanliness and damage.

(b) Clean or replace screens as required.

(c) Local conditions may require more frequent check of some strainers, such as those used for truck unloading.

(8) Water Defense System Inspection & Test

(a) Check operation of water defense systems in accordance with annual requirements of ([Ref. ATA Spec. 103, section 3-12]).

3. Hydrant System Checks

A. General

(1) The following checks must be performed on all hydrant fueling systems servicing aircraft and at the frequencies specified. Additional tasks or more frequent checks may be required based on local conditions.

(2) Daily checks and inspections should be made at the beginning of each work day including weekends and holidays.

(3) All personnel engaged in ramp operations must be continuously observant of abnormal conditions that may exist in and around fuel pits. any fuel leaks, fire/safety hazards, or adverse conditions must be reported immediately.

(4) Aircraft operators shall be notified by contracted fueling agent of any modifications, changes, or construction work to hydrant system. Hydrant systems must be flushed per ([Ref. ATA Spec 103, section 3-15]).

(5) Hydrant systems or segments of hydrant systems not in daily use must have all daily, monthly, semi-annual and annual checks current and recorded before the system, or segment is returned to service. Based on fuel test results, flushing may be required by aircraft operator prior to use. Records must indicate when systems are out of service.

B. Hydrant System Check Records

(1) Records, paper or electronic, must be completed by the person performing the tasks, or by the person accepting responsibility for performance of the tasks.

(2) Use of Forms 103.05, A through C, is recommended, but not required. No variance authority is needed house other forms if they meet or exceed the task and frequency requirements specified in this section. Additional copies of Form 103.05 may be reproduced locally ([Ref. ATA Spec 103, section 6-2]).

(3) The legible signature, initials or employee identification number of the person performing the tasks or the person accepting responsibility for the performance of the tasks is required.

(a) If initials or employee identification numbers are used, a record of each person's name and initials/identification number must be maintained and available for review.

(b) Supporting documentation with the signature, initials or identification number of the person actually performing the tasks must be available if another person has signed the form accepting responsibility for accomplishment of the tasks.

(4) Records must indicate when fueling equipment is not used.

(5) Retain records, including supporting documentation, in local files for 12 months.

(6) Upon completion of the checks, record results using the following condition codes:

S = Indicates Satisfactory

C = Indicates Comment. Comment required in remarks section. Corrective action must be documented and dated.

NU = Indicates unit Not Used.

N/A = Indicates Task Not Applicable

Sump samples are to be rated occurring to [Ref. ATA Spec 103, section 3-1].

C. Daily Checks

(1) Hydrant Pit

(a) Visually check hydrant pits and all components for deficiencies.

(b) Pits should be clean & free of standing liquid.

NOTE: Daily accumulation of liquid can be present, between daily cleaning operations, provided the level is below the hydrant valve inlet flange.

(c) Dust covers on the hydrant valve flange must be present and installed when the pit is not in use refueling.

(d) Correct deficiencies in a timely manner.

(2) Emergency Fuel shutoff (EFS) Stations

(a) Verify that all emergency fuel shutoff stations on the ramp have:

1 Clear access.

2 A sign or placard identifying EFS location.

D. Monthly checks

(1) Isolation Valve Pits and Control Vaults

(a) check isolation valve pits for:

1 Emergency access.

2 Fuel leaks.

3 Standing liquid and debris.

4 General condition of all components.

(b) Verify proper operation of valves.

(c) Correct any deficiencies found.

(2) Hydrant Valve Assembly

(a) Check the general condition of the hydrant pit valve and sense line connectors.

(b) Verify the satisfactory operation of the hydrant pit valve.

(c) Check for leaks, excessive coupler mating flange wear and loose or missing fasteners.

(d) Promptly correct any deficiencies.

(3) Low Point Drains

(a) Fully open all low point drain valves to ensure maximum possible flow. Keep valve open until all water and/or sediment is removed.

(b) Flush a minimum of two (2) gallons at each low point until clear fuel is obtained to ensure positive removal of all contaminants.

(c) Replace missing tags or markings to pit lids or low point drain valves as required to ensure proper identification.

(4) Emergency Fuel shutoff

(a) Verify the satisfactory operation of the emergency shutoff system, by actuating one or more of the control devices for each zone.

(b) Coordinate the shutoff test with all persons, fueling agents, fuel supplies, and any other group having an interest in the operation of the facility.

(c) Each control device must be tested at least once a year.

(d) Immediately repair any discrepancies.

NOTE: If for any reason the emergency shutoff system cannot be repaired immediately, system operator must have an approved alternate plan in effect for continuing system use until discrepancies are corrected.

E. Quarterly Checks

NOTE: A minimum of 60 days must elapse between quarterly checks.

(1) High Point Vents

(a) Bleed all high point vents to ensure the removal of all entrapped air.

(b) Continue to bleed air until clear fuel is present.

(c) It is necessary to bleed high point vents more frequently if pipeline was drained or modified, allowing air entry into system.

(d) Replace missing tasks or markings to pit lids or high point vent valves as required to ensure proper identification.

(2) Surge Absorbers

(a) Where installed, check the general condition and operating pressure setting of each unit.

(b) Recharge as required.

(3) Leak Detection and Piping Isolation Systems

(a) Where installed, check the satisfactory operation of pipeline leak detection systems and pipeline monitoring wells.

(b) Monitoring devices and fuel flow shutoff valves are to be tested.

(c) Immediately report and repair any deficiencies.

NOTE: In critical areas, i.e., baggage rooms, basements, etc., this task may be more frequent base on local needs and exposure.

F. Annual checks

(1) Cathodic Protection

(a) Where installed, confirm satisfactory operation of cathodic protection systems. This requirement is generally contracted to businesses specializing in this type of service. State or local regulations may require greater frequency of inspection.

4. Aircraft Fueling Equipment Requirements

REV. NO.: 23 DATE: 05-03-17	ABX FUEL MANAGEMENT

CAUTION: ZINC GALVANIZED MATERIALS MUST NOT BE USED IN JET FUEL SERVICE. NO COPPER ALLOYS, CADMIUM PLATING OR PLASTIC MATERIALS ARE PERMITTED FOR MAIN FUEL PIPING. THE USE OF COPPER OR COPPER ALLOY MATERIALS FOR OTHER COMPONENTS MUST BE MINIMIZED.

A. General

(1) All aircraft fueling equipment, including refueling trucks, hydrant vehicles, hydrant carts and fueling cabinet, must comply with the requirements in this section.

(2) Fueling equipment shall be free of leaks.

(3) Tires, wheels, wheel studs/nuts and axle studs/nuts must be maintained in a safe and operational condition.

(4) Electrical equipment, including lights, light lenses and wiring, must be maintained in a safe and operational condition. Battery terminals must not be exposed.

(5) Windows must be clean and free of cracks and crazing.

B. Filter/Separator or Full Flow Fuel Monitor

(1) All aircraft fueling equipment must have a Filter/Separator or a Full Flow fuel Monitor.

(a) All new vessels and element combinations shall meet [API/IP 1581] latest edition. Existing vessels and element conversions shall meet, by test or similarity, the latest edition of [API/IP 1581] / [API/IP 1582]. For existing vessels, conversion to the latest edition shall occur within 12 months of qualified elements becoming available for a specific vessel. If qualified by similarity, similarity data sheet must be maintained locally and a data plate reflecting such qualification must be attached to the filter vessel.

1 Filter/Separators must be equipped with an automatic water defense system that will cause fueling to stop when activated by excessive water.

a Water defense systems must include provisions for an operational test.

2 Full flow fuel monitors must meet the requirements of [IP 1583].

a Full flow fuel monitors must be equipped with a pressure limiting device that will prevent excessive differential pressure from damaging elements in the event of complete blockage.

CAUTION: FULL FLOW MONITORS SHOULD NOT BE USED WITH FUELS CONTAINING FUEL SYSTEM ICING INHIBITORS (FSII). THE WATER REMOVAL PERFORMANCE OF FULL FLOW MONITORS MAY BE REDUCED WITH FUEL CONTAINING FSII.

3 All filtration vessels must include:

a Air elimination provisions.

b Direct reading differential pressure gauges with an accuracy of +/-2 PSI.

c Manual sump drains - Valves with handles spring loaded to the closed position are recommended.

d Upstream and downstream membrane sampling connections, including probes and dust covers.

e Pressure relief valve or other device that will prevent over-pressurization due to thermal expansion of fuel. Include a means for accommodating relieved fuel.

NOTE: An API monogram is not necessary to meet the requirements of this document.

C. Pressure Controls

(1) All aircraft fueling equipment must have separate and independent primary and secondary pressure control devices.

(a) Primary pressure control is intended to protect the aircraft under conditions of constant flow and also from pressure surge caused during aircraft valve closure.

(b) Secondary pressure control is intended to protect the aircraft in the event of primary pressure control failure.

CAUTION: FUELING PRESSURE CONTROL SYSTEMS SHALL NEVER ALLOW THE ACTUAL FUEL PRESSURE, MEASURED AT THE FUEL NOZZLE, TO EXCEED THE PRESSURE INDICATED BY THE OPERATOR'S GAUGE.

(c) Fuel pressure control systems may utilize the following:

1 Pressure controlling hydrant pit valves.

2 Pressure controlling hydrant pit couplers.

3 In-line pressure control valves.

4 Hose End Pressure Control Valves (HEPCV).

5 Pressure switches that will cause rapid shutoff of fuel flow in the event of high fueling pressure.

(d) Pressure control devices must limit fueling pressure, at the fuel nozzle, to 50 psig or less under conditions of constant flow.

D. Deadman Control System

(1) All aircraft fueling equipment must have a handheld deadman control device. The deadman control system must completely stop fuel flow within 5 percent of the fuel flow rate at the time of release.

EXAMPLE: If actual fuel flow rate at the time of deadman control release is 500 gpm, total overrun must not exceed 25 gallons.

E. Emergency Fuel Shutoff System

(1) Hydrant vehicles, hydrant carts and fueling cabinets must be equipped with an emergency fuel shutoff system in addition to a deadman control.

(a) Each unit must have an emergency fuel shutoff control accessible from the ground.

(b) Units equipped with a lift or platform must have an emergency fuel shutoff control accessible from the lift or platform, in addition to one accessible from the ground.

(c) The system should stop the fuel flow by automatically closing the hydrant pit valve upon activation.

(2) Refueling tracks must be equipped with an emergency fuel shutoff control accessible from each side of the truck.

(a) Units equipped with a lift or platform must have an emergency fuel shutoff control accessible from the lift or platform, in addition to one accessible from the ground.

(b) The emergency fuel shutoff system should also close the tank outlet valves.

(3) Each emergency fuel shutoff control must completely stop fuel flow within a maximum of 5 percent overrun, but at flow rates below 50% of rated flow, a shutdown in 10% of the fuel flow rate is allowed.

EXAMPLE: If actual fuel flow rate at the time of emergency fuel shutoff activation is 500 gpm, total overrun must not exceed 25 gallons.

F. Fire Extinguishers

(1) Hydrant vehicles, hydrant carts and fueling cabinets must be equipped with a minimum of one 20-B:C rated dire extinguisher, securely mounted and readily accessible.

(2) Refueling trucks must be equipped with a minimum of two 20-B:C rated fire extinguishers, securely mounted on opposite sides of the truck and readily accessible.

(3) Seals must be intact.

(4) Current inspection, testing and recharging records must be attached or available if using Inspection Tracking System, i.e. barcode.

G. Safety Interlock System

(1) All mobile fueling equipment must have a safety interlock system which will prevent the equipment from being moved when:

(a) Couplers and/or nozzles are not in their stowed position.

(b) The pumping system is activated on tank trucks.

(c) Lift platforms are in the extended position.

(2) The interlock system may stop the engine on motorized equipment, but should also apply the vehicle brakes.

(3) Refueling trucks with bottom loading provisions shall incorporate a brake interlock system that will prevent the vehicle from being moved until the bottom loading coupler has been disconnected from the vehicle.

(4) Interlock systems shall be equipped with an override device i.e., push-button, spring loaded toggle switch, lever device, etc. Regardless of the type and location, it shall be secured in the normal position, with a breakaway seal. Placards identify normal and override positions. A light, indicating override activation is recommenced and should be prominently located in the vehicle cab.

NOTE: Non-motorized, (towable) hydrant carts are not required to be equipped with a safety interlock system.

H. Aircraft Fueling Hoses

(1) Hoses and couplings must meet the following standard when purchased by the end user:

(a) [API 1529], Grade 2, Type C, latest edition.

(2) Hoses shall be installed within 2 years of the date of manufacture, and have a maximum service life of 10 years from the date of manufacture.

(3) If reusable coupling are installed on hoses, the couplings and hose shall meet the requirements of [API 1529] and operator shall abide by the periodic pressure testing requirements of [API/IP 1540] latest edition.

(4) Operators choosing to reattach couplings must undergo training from the hose or coupling manufacturer.

CAUTION: PRIOR TO THE PERIODIC PRESSURE TESTING OF AN AIRCRAFT FUELING HOSE, THE MAXIMUM ALLOWABLE PRESSURE RATING OF THE ATTACHED VALVES, METERS, OR SWIVELS SHOULD BE CHECKED TO PREVENT POSSIBLE INJURY TO THE OPERATOR OR DAMAGE TO THE EQUIPMENT. IT MAY BE NECESSARY TO REMOVE THE FUELING HOSE PRIOR TO TESTING. FOLLOWING THE SAFETY PRECAUTIONS OUTLINED IN [API/IP 1540] IS HIGHLY RECOMMENDED.

NOTE: An API monogram is not necessary to meet the requirements of this document.

I. Manual Isolation Valves

(1) Equipment with multiple aircraft delivery hoses must have a manual isolation valve installed upstream of each delivery hose.

J. Dust Covers

(1) Dust covers or other protective devices must be used to prevent debris from accumulating on mating surfaces of hydrant couplers and aircraft fueling nozzles.

K. Strainers and Swivels

(1) Aircraft fueling nozzles must be equipped with 100 mesh strainers.

(2) Hydrant coupler and aircraft fueling nozzle swivel retention devices must be quipped with at least two levels of redundancy, such as collar lock rings and collar retention screws secured by safety wire.

L. Aircraft Fuel Pressure Gauges

(1) A pressure gauge is required for monitoring aircraft fueling pressures.

(2) Gauges should be located where they will be visible to the equipment operator during aircraft fueling operations.

(3) Gauges shall have a minimum face diameter of 4 inches and must have an accuracy of +/-2% of full scale.

(4) Digital pressure displays shall have a minimum character height of 3/4 inch.

NOTE: Four-inch diameter requirement does not apply to nozzle-mounted gauges.

M. Fuel Quantity Measurement Meter

(1) Meters must be capable of maintaining accuracy of 1/10 of one percent (0.1%) and repeatability of 1/20 of one percent (0.05%) at flow rates ranging from 100 gpm to the maximum rated flow of the fueling equipment.

(2) Calibrator/adjustor must be sealed.

N. Electrostatic Bonding System

(1) Electrostatic bonding system must have less than 25 ohms total resistance.

O. Signs, Placards & Labels

(1) The following signs, placards or labels must be placed on the equipment as indicated:

(a) Product identification on each side and rear.

(b) FLAMMABLE on each side and rear.

(c) NO SMOKING posted prominently in cab of vehicles.

(d) NO SMOKING on at least two sides.

(e) EMERGENCY FUEL SHUTOFF placard adjacent to each emergency fuel shutoff control. Placards must also indicate method of operation (e.g., push, pull, turn, etc.).

(f) Fire extinguishers located in enclosed compartments shall have their location clearly marked.

(g) Aircraft fueling pressure and filter differential pressure gauges shall be identified.

(h) Filter and tank drain valves shall be identified.

(i) A placard indicating the date (Month and Year) during which the filter elements were last changed shall be placed on the filter housing.

(j) A placard indicating the date (Month and Year) of the last satisfactory single element test, if applicable, shall be place on the filter housing.

(k) A sign or placard indicating proper procedure for engaging the pumping system should be prominently displayed adjacent to pump controls.

P. Additional Requirements for Refueling Trucks

(1) Cargo Tanks must be constructed of stainless steel, aluminum or internally light color epoxy coated carbon steel.

(2) Dome covers must be provided with:

(a) If installed, forward mounted hinge and latches must automatically cause the cover to close and latch with forward motion of the vehicle.

(b) Water-tight, fuel resistant seals and gaskets.

(3) Each tank compartment must be quipped with a water drain located at the lowest point.

(a) Valves with handles spring loaded to the closed position are recommended.

(4) Tank outlets should be quipped with shutoff valves located inside the tank shell.

(5) Refueling trucks with bottom loading capability must be equipped with a high level shutoff system. The system may activate a shutoff device that is mounted on-board the truck or on the loading station. Provisions for ensuring the satisfactory operation of the system (known as a “pre-check) shall be included. The pre-check system should simulate a high level condition in the truck by submerging the sensing device in fuel.

(6) Recirculation connections are recommended. If equipped, recirculation systems shall be arranged so that all fuel is recirculated into product tank, i.d., no fuel is to be recirculated into the pump suction.

(a) The refueler must have a means of ensuring that the internal valve is closed except when bottom loading or fueling.

5. Aircraft Fueling Equipment Checks

A. General

(1) The following periodic checks must be performed by qualified individuals, at the specified frequencies, on all aircraft fueling equipment, including fueling cabinets. Additional or more frequent checks may be required due to local conditions.

(2) Maintenance requirements specified in this section are generally limited to those items required for maintaining fuel quality and safety. Additional programs should be established to ensure mechanical reliability of all equipment servicing aircraft.

(3) Daily checks must occur each calendar day prior to, or during the first aircraft servicing of the day. Tanker truck tank sumping must be performed.

(4) Any fueling equipment not in daily use must have all daily, monthly, quarterly and annual checks current and recorded before the equipment is returned to service.

B. Aircraft Fueling Equipment Check Records

(1) Records, paper or electronic, must be completed by the person performing the tasks, or by the person accepting responsibility for performance of the tasks

(2) Us of Forms 103.04, A through C, is recommended, but not required. No variance authority is needed to use other forms if they meet or exceed the task and frequency requirements specified in this section. Additional copies of Forms 103.04, A through C, may be reproduced locally ([Ref. ATA Spec 103, section 602]).)

(3) The legible signature, initials or employee identification number of the person performing the tasks or the person accepting responsibility for the performance of the tasks is required.

(a) If initials or employee identification numbers are used, a record of each person’s name and initials/identification number must be maintained and available for review.

(b) Supporting documentation, completed by the person actually performing the tasks and containing their signature, initials or identification number must be available if another person has accepted responsibility for accomplishment of the tasks.

(4) Records must indicate when fueling equipment is not used.

C. Records Retention

(1) Retain records in local files as follows:

(a) Daily, Monthly, Quarterly, Semi-Annual, and Annual check records - 12 months.

(b) Filter Change records - 36 months.

(2) Upon completion of the checks, record results using the following condition codes:

S = Indicates Satisfactory

C = Indicates Comment. Comment required in remarks section. Corrective action must be documented and dated.

N/U = Indicates unit Not Used.

N/A = Indicates Task Not Applicable

(3) Sump samples are to be rated according to ([ATA Spec 103, section 3-1]).

D. Daily Checks

(1) General Condition

(a) Check the general condition of the fueling vehicle for safety defects, fuel leaks, damage and proper appearance.

(b) Take appropriate corrective action for noted defects.

(c) Units with fuel leaks are not to be used to service aircraft.

(2) Filter Sumps

(a) Filter vessel must be under pressure, but fuel does not have to be flowing through the vessel when the sample is taken.

(b) Drain approximately one gallon of fuel into a suitable container. Fuel flowing from sump drain valve should be at maximum practicable flow to ensure adequate flushing occurs.

CAUTION: IF A PLASTIC CONTAINER IS USED FOR AN APPEARANCE TEST, IT SHALL BE EQUIPPED WITH STATIC BONDING CAPABILITY.

(c) Perform fuel appearance test of filter sumps according to ([ATA Spec 103, section 3-1]).

(d) Record findings of first sample taken according to ([ATA Spec 103, section 3-1]).

(e) Continue to sample until clean, dry fuel is obtained.

(f) Remove unit from service if unable to obtain clean, dry sample after three samples have been drained. Report unusual contamination to aircraft operators if it is anticipated that such contamination may impact aircraft operations.

(3) Filter Differential Pressure

(a) Observe and record differential pressure with fuel flowing through filter under normal maximum flow conditions ([ATA Spec 103, section 3-9]).

(b) Filter differential pressure must be periodically monitored during fueling operation. Remove unit from service if a sudden drop in differential pressure from previous readings is observed or if differential pressure exceeds 15 psi on filter/separators or full flow monitors.

(4) Deadman Controls

(a) Perform a functionality check of the deadman control system.

(b) Remove vehicle from service if deadman control does not function properly.

(5) Safety Interlocks

(a) Verify proper operation of safety interlock system.

1 Remove one nozzle from its storage position and attempt to move unit. Unit should not move.

NOTE: Some refueling trucks may move slightly under heavy engine acceleration due to high gear reduction drive trains. Movement should be minimal and must stop immediately upon returning engine to idle.

2 Repeat task for each additional nozzle, coupler, lift platform and bottom loading interlock, as applicable.

3 Defective interlock systems should be repaired immediately.

(6) Nozzle Fueling Pressure

(a) Check and record nozzle delivery fueling pressure.

(b) Nozzle pressure must be periodically monitored during fueling operation.

(c) Nozzle pressure should not exceed 40 psig under conditions of constant flow.

1 Pressure in excess of 40 psig, but less than 50 psig, indicates an out of adjustment or malfunctioning primary pressure control. Investigate and correct as necessary.

2 Pressure fluctuations greater than +/-10 psi, under conditions of constant flow, may indicate a malfunctioning pressure control system, and should be investigated.

(d) Immediately remove unit from service if pressure exceeds 50 psig.

(7) Hoses, Nozzles & Swivels

(a) check condition of all fuel hoses, swivels, nozzles and couplers for damage, leakage or excessive wear, (e.g. cracks that expose the internal reinforcement).

(b) Ensure dust covers or other protective devices are available, installed and in good repair.

1 Check hoses for abrasions, cuts, soft spots, carcass separation, worn covers, blisters, exposed reinforcement, cracks, twists and sharp bends that give the appearance of pending failure.

2 Check the tightness and safety wiring of all swivel and collar attachment screws and hose couplings.

3 Check condition of nose and poppet seals on nozzles for cuts, nicks and wear.

(c) Any item which is defective or leaking must be repaired or replaced before being used to service aircraft.

(8) Static Reels, Cable & Clamps

(a) Check the condition of static bonding reels, cables, clamps and connections.

(b) Any defect that affects continuity must be corrected prior to use.

NOTE: Continuity must be checked after maintenance to static bonding systems.

(9) Lift Platforms

(a) Check the general condition and verify proper operation of lift platforms.

(b) Remove unit from service if deficiencies are noted.

(10) Fire Extinguishers

(a) Verify that fire extinguishers:

1 Are located in their designated place.

2 Are tagged to indicate monthly inspections are current.

3 Have unbroken safety seals or tamper indicators.

4 Have no obvious physical damage, corrosion or leakage.

5 When so equipped, the pressure gauge reading or indicator is in the operable range or position.

(b) If any fire extinguisher is missing or does not meet the criteria listed above, it shall be repaired or removed from service and replaced with a serviceable extinguisher of the same or greater capacity.

(11) Surge/Waste Tanks

(a) Check and drain, if applicable, atmospheric surge tanks, thermal relief tanks or waste fuel tanks.

(12) Air Tanks

(a) Drain all moisture from air tanks to prevent damage to air system components and freezing during cold weather.

(13) Refueling Truck Troughs

(a) Check truck troughs for water.

(b) If standing water is present, clean troughs and drains.

(14) Refueling Truck Sumps

(a) Drain minimum of one gallon of fuel at high flow rate into a suitable container.

CAUTION: IF A PLASTIC CONTAINER IS USED FOR AN APPEARANCE TEST, IT SHALL BE EQUIPPED WITH STATIC BONDING CAPABILITY

(b) Perform fuel appearance test on a fuel sample from each tank compartment ([ATA Spec 103, section 3-1]).

(c) Record findings of first sample until clean, dry fuel is obtained.

(d) Continue to sample until clean, dry fuel is obtained.

(e) Additional checks are required during and immediately after inclement weather.

(f) Remove unit from service if unable to obtain clean, dry fuel after three samples have been drained. Report unusual contamination to aircraft operators, if it is anticipated that such contamination may impact aircraft operations.

(15) Refueling Truck Bottom Loading Pre-Check

(a) Verify proper operation of high level shutoff systems on refueling trucks, which are bottom loaded with an inoperative high level shutoff system unless alternate procedures are followed.

E. Monthly Checks

(1) Filtration Test & Free Water Test

(a) Perform a membrane color/particle (Millipore) simultaneously, under flow, upstream and downstream of each filter/separator.

(b) Perform a free water test downstream of each filter/separator and monitor vessel.

(c) On a monthly basis, determine the “corrected” filter differential pressure using the appropriate manufacturer curve charts or programs (Ref. [Section 3-2] and [Section 3-3]).

NOTE: Use of bottom loading connections on tank trucks for recirculation must be avoided in order to prevent erroneous test results.

(2) Corrected Filter Differential Pressure

(a) Under normal flow conditions, check and record observed differential pressure, flow rate, and corrected differential pressure across each working filter.

(3) Static System Continuity Test

(a) Perform electrical continuity check of static bonding system.

(b) Resistance must be 25 ohms or less.

(c) Defective equipment must be repaired prior to servicing aircraft.

(4) Nozzle Screens

(a) Examine each nozzle screen for particles or other solid contaminants.

1 If particles are found, investigate possible sources of contamination (inner hose lining, pipe rust, sand, seals, gaskets, equipment failure, etc.) and take appropriate corrective action.

(b) Clean screens as necessary.

(c) Verify that screens are 100 mesh.

(d) Damaged screens are to be replaced.

(5) Fuel Hoses

(a) Lay hoses out full-length with system at full operating pressure and check hoses for abrasions, cuts, soft spots, carcass

separation, worn covers, blisters, exposed reinforcement, cracks, twists and sharp bends that give the appearance of pending failure.

(b) Check couplings at both ends for cracks and signs of slippage or leakage.

(c) Replace any defective hoses prior to further servicing of aircraft.

(6) Signs, Labels & Placards

(a) Verify that unit is clearly marked with applicable signs, placards and labels.

1 Product identification on each side and rear.

2 FLAMMABLE on each side and rear.

3 NO SMOKING on at least two sides.

4 NO SMOKING posted prominently in cab of vehicles.

5 EMERGENCY FUEL SHUTOFF adjacent to each emergency fuel shutoff control.

6 Placards indicating method of Emergency Fuel Shutoff operation, e.g., Push, Pull, Turn, etc.

7 Signs indicating location of fire extinguishers inside enclosed compartments.

8 Placards identifying Nozzle Fueling Pressure.

9 Placards identifying Filter Differential Pressure.

10 Placards identifying Filter and Tank Drain valves.

11 Placard indicating the last date (Month and Year) during which the filter elements were replaced.

12 Placard indicating the date (Month and Year) of a satisfactory single element test was performed, if applicable.

13 Other information and instructional markings as required by local conditions.

(7) Meter Seals

(a) Verify that meter calibrators/adjusters are sealed.

(b) Meters with missing seals may only be used with airline permission and must be calibrated.

(8) Fire Extinguishers

(a) Check each fire extinguisher for inspection tag and seal.

(b) Maintain extinguishers in accordance with the applicable [NFPA 10] guidelines.

(c) Upon completion of the inspection, update inspection tag.

(9) Emergency Fuel Shutoff System

(a) Verify that each emergency fuel shutoff control device will completely stop fuel flow before overrun has exceeded 5 percent of actual flow rate at the time of release.

EXAMPLE: If actual flow rate is 400 gpm, fuel flow must completely stop within 20 gallons of emergency shutoff activation.

(b) Equipment with a defective emergency fuel shutoff system must be removed from service until the system has been repaired.

(10) Deadman Control System

(a) Verify that the deadman control system will completely stop fuel flow before overrun has exceeded 5 percent of actual flow rate at the time of release.

EXAMPLE: If actual flow rate is 400 gpm, fuel flow must completely stop within 20 gallons of emergency shutoff activation.

(b) Equipment with a defective deadman control system must be removed from service until the system has been repaired.

(11) Lift Platforms

(a) Verify the safe and dependable operation of all lift platforms.

(b) Thoroughly inspect the lift, including lift and emergency let-down mechanisms, lift interlocks, hydraulic lines, couplings lighting, wiring, handrails, steps, working surface and signing.

(c) any deficiencies must be repaired prior to returning unit to service.

(12) Refueling Truck Interiors

(a) Visually inspect tank interior from dome cover openings for water, debris, surfactants, microbial growth and other contamination.

(b) Check epoxy coated tanks for coating deterioration.

(c) Clean and repair as necessary.

(13) Refueling Truck Vents & Dome Covers

(a) Check tank dome covers, including latches, hinges, seals and gaskets.

(b) Verify that hinges are forward mounted and will close with forward motion of the vehicle.

(c) Verify proper operation of tank vents.

(d) Correct any deficiencies as necessary.

(14) Refueling Truck Trough Drains

(a) Manually check trough drains for plugging.

1 Use cable or wire to ensure that there are no obstructions present.

(b) More frequent checks may be required during inclement weather.

F. Quarterly Checks

NOTE: A minimum of 60 days must elapse between quarterly checks.

(1) Vehicle Inspection

(a) Perform a thorough overall inspection of the unit to identify components with excessive wear and pending equipment failure.

(2) Pressure Controls

(a) Operator must have written test procedures specific to the vehicle pressure control systems and test facilities at that location.

(b) Check all primary and secondary pressure control equipment. Adjust as necessary. Record primary and secondary fuel pressure settings.

(c) Regardless of type, the primary pressure control system must be defeated to properly test the setting of the secondary control system.

CAUTION: NEVER ADJUST PRESSURE CONTROL EQUIPMENT WHILE FUELING AN AIRCRAFT.

NOTE: All testing of pressure control equipment should be conducted at a test facility or through test connections on tank trucks.

NOTE: When performing this test it is required that a calibrated gauge is utilized to directly measure the pressure in the nozzle or the fixture the nozzle is connected to. The test shall have the operator restrict flow by partly closing a valve downstream until the pressure in the nozzle is at its maximum both with the primary pressure control enabled and disabled.

(3) Water Defense System Check - External Check

(a) Check operation of water defense system in accordance with quarterly requirements of ([ATA Spec 103, section 3-12]).

NOTE: Filter/separators that have been converted to monitors are not required to have the water defense systems checked.

(4) Internal Valve Check

(a) Test to ensure that the internal valve functions properly utilizing the “Pre-Check” test.

(5) Interlock Override Function Check

(a) Verify the proper operation of the interlock override control by having at least one interlock device activated, ensuring vehicle does not move until activating interlock override.

(b) Upon satisfactory verification of the operation of the override control, seal the control back in the normal position using breakaway wire or breakaway plastic seal.

G. Semi-Annual Checks

(1) Hose Pressure Check

(a) Refueling hoses fitted with reusable couplings, and being operated under system pressure, must undergo the six-month pressure testing at 225 PSI, per the requirements found in [API/IP 1540].

NOTE: Pressure testing to 300 PSI is required whenever a new hose attachment or coupling is fitted.

CAUTION: RECOUPLING AND PRESSURE TESTING OF HOSES AND FITTINGS SHOULD ONLY BE CARRIED OUT BY PERSONS ADEQUATELY TRAINED IN THEIR PROPER FITTINGS AND TESTING, AND APPROVED BY THE OEM.

H. Annual Checks

(1) Filter element Change

(a) Replace filter/separator filter elements. ([Ref. ATA Spec 103, Section 3-12])

1 Coalescer element service life may be extended to a maximum of two years, provided the criteria in ([Ref. ATA Spec 103,
Section 3-14])

(b) Teflon and synthetic separator elements may be reused, provided that they are cleaned and tested in accordance with the element manufacturer procedures.

(c) Full flow monitor elements are to be replaced annually.

(d) A visual inspection of all vessel interiors is to be performed on an annual basis regardless of filter element replacement frequency.

1 Verify that the vessel interior is generally clean and free of water, sediment, evidence of microbial growth or other contamination. Clean interior and repair coating as necessary.

2 Verify that all elements are undamaged and secure.

(2) Fueling Pressure and Differential Pressure Gauges

(a) Verify that accuracy of fueling pressure (or nozzle pressure) gauges used to monitor fuel delivery to aircraft is within +/-2% of full scale.

(b) Verify proper operation of filter differential gauge(s) in accordance with gauge manufacturers' procedures. Repair or replace as required. ([Ref. ATA Spec 103, Section 3-92])

(c) Replace, or repair and calibrate defective gauges.

(3) Meter Calibration

(a) Check accuracy of all aircraft fueling equipment meters.

(b) Adjust meters to an accuracy of +/-0.10%. Verify repeatability of +/-0.05%.

1 Meter adjusters/calibrators are to be sealed upon completion of calibration.

(4) Water Defense System Inspection and Test

(a) Check operation of water defense system in accordance with annual requirements ([Ref. ATA Spec 103, Section 3-12])

6. Refueling Truck Loading

CAUTION: (1) DURING LOADING OF THE REFUELING TRUCK, THE EQUIPMENT MUST NOT BE LEFT UNATTENDED AT ANY TIME.

CAUTION: (2) IT IS NOT ACCEPTABLE TO TRANSFER FUEL INTO A REFUELING TRUCK WHILE IT IS REFUELING AN AIRCRAFT.

CAUTION: (3) IT IS NOT ACCEPTABLE TO TRANSFER FUEL FROM A TRANSPORT TRUCK INTO A REFUELING TRUCK.

CAUTION: (4) REFUELING TRUCKS SHOULD NOT BE LOADED DIRECTLY FROM HYDRANT SYSTEMS, HYDRANT VEHICLES OR CARTS. IF REFUELING TRUCKS ARE FILLED FROM A HYDRANT SYSTEM, ADDITIONAL PRECAUTIONS SHOULD BE TAKEN TO PROTECT AGAINST OVER PRESSURIZATION, STATIC DISCHARGE AND SPILLAGE.

(a) The refueling truck must be bonded to the loading facility piping (unpainted surface) during filling operations. Bottom loading control systems do not negate the need to bond with a separate bonding cable.

(b) If top loading, the loading arm piping shall be bonded to the truck and the loading tubing shall be extended to the bottom of the truck to prevent “splash” loading.

(c) If bottom loading, the loading operation shall be started and the pre-check operated immediately to ensure proper operation of high level shutoff system.

WARNING: IF THE PRE-CHECK SYSTEM DOES NOT OPERATE PROPERLY, THE FUEL TRUCK OPERATOR MUST MONITOR THE RISING FUEL LEVEL TO PREVENT OVERFILL.

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DISPOSAL OF DEFUELED PRODUCTS

1. Load Adjustments

A. When making a load adjustment, if there is no reason to suspect the quality and grade of the fuel, fuel may be defueled through a filter separator into a hydrant or storage system if so designed or into a refueler. It is desirable to defuel into an empty vehicle, however, defueled product may be commingled with the contents of the refueler or storage system. Commingled fuel must be approved by all affected airlines.

B. Whenever possible, product which has been defueled for load adjustment purposes should be returned to the aircraft of the same airline.

C. It is normal to find traces of haze or cloud in some fuel tanks in transient jet aircraft after being refueled. This condition is a result of mixing warm fuel with cold fuel and should disappear as the fuel reaches a uniform temperature. When in doubt about defueled product which has a cloudy or hazy appearance, contact immediate supervisor or fuel vendor for proper disposition.

2. Maintenance

A. Defueling may be necessary to perform mechanical work on an aircraft which requires that the tanks be empty. If the aircraft has been operating, and there is no reason to suspect the quality and grade of the defueled product, the aircraft may be defueled into refuelers. It is desirable to defuel into empty vehicles when possible, but defueled product may be commingled with the contents of the vehicle. Aircraft may be defueled through a filter separator into a storage system if so designed.

B. Contaminated fuel shall not be returned to airport storage or used in aircraft.

3. Handling Mixtures of Jet A and Jet B

These mixtures shall be handled in a manner similar to that of contaminated fuel. This fuel may be reused providing approval is received from the airline involved. This mixture shall NOT be returned to airport storage.

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ABX FUEL MANAGEMENT	REV. NO.: 22 DATE: 10-04-16

FUEL TESTING

1. Testing ([Ref. ATA Spec 103, Chapter 3])

A. Among the most critical factors influencing quality of fuel is the level of contamination in the fuel and the fueling system. Proper techniques for maintaining cleanliness are capable of reducing fuel contamination to a very low level which gives assurance of quality fuel into the aircraft. It is essential, however, that the contamination control system be closely monitored on a regularly scheduled basis and especially true as the increase fuel throughputs begin to tax the capabilities of the filtration/separation system.

B. There are four major types of contaminates in aviation fuels and each is responsible for a specific problem. These four types and their control are described briefly below.

(1) Particulates:

(a) Foreign objects such as siliceous particles, metal chips and oxides, resins, gums and other extraneous material are present in fuel and it becomes the primary function of the filter elements to remove these particles. Filtration generally removes most of the particles except the very small ones. As usage increases, the elements become less efficient, larger particles pass through and tend to collect in the engine fuel system causing plugging of small orifices, restricting moving parts and causing erosion of controlling surfaces. Detection of this can most easily be made by monthly millipore test of fuel storage facility and of refueling units.

(2) Water:

(a) Storage tanks, refueler trucks, and aircraft tanks invariably collect water from condensation or "breathing." Water may also find its way into fuel systems from small leaks or from original supply. Fuels may carry up to 150 ppm of water in solution with warm temperatures and this water will somewhat precipitate when the fuel cools. The most adverse effect of water in fuel is the danger of freezing in the aircraft fuel system at higher altitudes (low temps) and secondly it supports the growth of microorganisms in the fuel. The primary method for water control and detection is proper settling time and taking a sample from the storage tanks, truck tanks, aircraft tanks and all water separator sumps on a regular basis. The sample must be taken in a stainless steel, white porcelain bucket or a refuel truck’s closed circuit sampler and visually examined for presence of water.

(3) Microorganisms:

(a) Bacteria and fungi can live and propagate in hydrocarbons (kerosene). They receive nutrients from the fuel and if water is present the organisms begin to grow. With absence of water the organisms remain dormant and are carried along in the fuel stream until they contact water, propagation then begins at a high rate. These organisms appear generally as slimes and sludges and are most easily detected with the millipore test. Control of water in the fuel is most critical to prevent the microbiological contamination from developing.

(4) Surfactants:

(a) Surface acting agents in fuel are the result of the refining process and cleaning of refining equipment and pipelines. These are in the form of sulfates, naphtenates and detergents. The surfactants tend to cause the fuel molecules to join with available water molecules and thereby hold the water in suspension. This then deters particulate and water settling and will disarm the water separation function of the system. Clay filtration by the fuel supplier is the accepted method to control surfactants and proper settling time is used to separate the water from the fuel.

C. To ensure fuel quality, certain testing must be accomplished. Methods and procedures to accomplish these tests are outlined as follows:

(1) Plastic container or White Porcelain Bucket or closed circuit sampler test methods.

CAUTION: IF A PLASTIC CONTAINER IS USED FOR AN APPEARANCE TEST, IT SHALL BE EQUIPPED WITH STATIC BONDING CAPABILITY.

CAUTION:

(a) Procure a suitable clean dry container such as a plastic container or white porcelain bucket.

NOTE: Closed circuit sampler is installed on the refuel truck.

(b) Drain or use sump pump to obtain sufficient quantities of fuel into the container as required to get a representative sample from the sump that is being tested. Make certain no precipitation or condensation enters the sample. When taking the sample from a

filter/separator sump it may be necessary to pressurize the system (pump "ON") to get a sufficient quantity.

(c) Swirl the fuel in the bucket (rotate bucket in circular motion) to centrifuge particles and then place the bucket on a level surface and allow it to settle until the air bubbles disappear from fuel surface.

NOTE: Fuel sample entering the closed circuit sampler produces a swirling effect.

(d) Examine the fuel in good light; the fuel should appear clear and bright, but may have a slight color cast. There should be no water floating or suspended particles.

NOTE: A shiny copper coin, dropped into the bucket, can be used as an aid in determining the clarity of the sample. If the coin characteristics can be easily distinguished, the fuel is considered neither hazy or cloudy. (N/A if closed circuit sampler is used)

(e) If water or excessive particles collect at the bottom of container or if the fuel appears cloudy (cloudiness is caused by water or air suspended in fuel), discard the sample and draw another until no free water or particular matter is present.

(f) If after 3 test samples fail to prove the fuel acceptable, the fuel must not be put on board the aircraft, refueler or into a fuel storage system. Notify the Line Service Supervisor immediately.

NOTE: If free water is found consistently in the samples, or if any brown or dark slimy water is found, an investigation must be made as to the source of the water or cause of the contamination. Retain a one-gallon representative sample of fuel and/or contaminant for analysis.

1 If test is performed for an off-line station, (International, International Charter, Domestic or International Diversionary) and the test results are unacceptable, request another refuel truck and repeat the test. If all trucks and all fuel supply agencies prove unacceptable, contact Flight Control.

2 If test results are acceptable for the off-line station, (International, International Charter, Domestic or International Diversionary), the following logbook info entry will need to be made:

A In the discrepancy column enter; " Info, Fuel White Bucket Test required".

B In the action taken column enter; "Fuel White Bucket Test was performed and the fuel was found to be acceptable."

NOTE: This info entry does not require a logbook page to be pulled.

(g) When accepting a fuel load from a transport truck, the following shall apply in addition to the above procedure:

1 The API Gravity Test shall be performed at time of each delivery. API gravity must be from 37 through 51 degrees, corrected to 60 degrees F. In the event that a non-dedicated transport is used, a valid flush ticket must also be provided.

NOTE: If there is a sudden change in API gravity of one (1) degrees or more from the same source or supplier, immediate investigation is required. Stop receipt of fuel from the source until the reason for the gravity change is determined. Reference chapter 01 section 02 paragraph 1. C.

2 If a fifth one-gallon test fails to prove an acceptable product, the fuel load should be rejected. However, if, in the operator's judgment, it appears that the sample quality is improving with each subsequent sampling, the operator can elect to continue sampling until a clear and bright sample is obtained .A limited number such as four or five solid particles (rust and or dirt) dispersed over the bottom of the bucket is not considered excessive.

3 If fuel is different in color, when compared to previous deliveries, the fuel shall not be unloaded until assurance has been received from the vendor that the fuel conforms to all specification requirements.

(2) Differential pressure check.

(a) The differential pressure check is to be taken while the unit being tested is under normal flow condition. The immediate supervisor shall be notified of any sudden increase or decrease in the differential pressure reading of the units checked. A sudden increase in delta "P" may be a result of high solid level in the fuel. A sudden decrease may result from a rupture of the element.

(b) Check systems equipped with a single gage and selector valve as follows:

1 Turn selector valve to inlet and note pressure indicated on gage.

2 Turn selector valve to outlet and note pressure indicated on gage.

3 Record both inlet and outlet pressures on Fueling Equipment Checklist.

4 Subtract outlet from inlet pressure to determine differential. Compare this result with previous differential readings.

(c) Some filter/separators are equipped with two gages, one for indicating inlet pressure and one for indicating outlet pressure. The differential pressure for these units is determined by subtracting the outlet reading from the inlet reading. Record inlet and outlet reading on form.

(d) On systems that incorporate single differential diaphragm operated gage record the differential pressure as read directly from gage.

(e) Some filter/separators are equipped with only one direct pressure reading gage with no means of determining differential pressure. On this type gage, record the reading when the filter elements are changed and use this reading to determine condition of elements.

Example: Reading at time of filter change is 32. Reading at another time is 34, indicating 2 PSI pressure rise.

(3) Filter Membrane test.

(a) Adequate attention must be given to proper sampling techniques to provide valid results. Sampling apparatus and filters must be clean. Sample size must be adequate and must be representative of the entire fluid system.

(b) The millipore sample should be taken at a point after the filter. Samples are normally taken after the filter on storage systems and can be taken before the filter to check condition of tank and effectivity of filter elements. With special emphasis placed on ecological control, every effort must be made to minimize fuel spillage and that all fuel used during testing be properly contained and suitably disposed of.

(c) A proper test can be made by flowing one gallon through the millipore apparatus. The amount of fuel that flowed through the filter membrane must be included on the data so a fair evaluation can be made.

1 Select a suitable point to take sample. If permanent sampling couplers are not installed, remove a convenient pipe plug, install probe (flow arrow should point in direction of fluid flow) and mount coupler.

NOTE: To minimize fuel spillage, fuel pressure should be reduced to zero prior to installing and removing coupler probes.

(d) Accomplish the following test using monitor housing with flush valve: (Continue to step 5 for housing without flushing provisions).

1 Install field monitor in holder (grid side down). Check that monitor has filter membrane and backup pad.

2 Insert bayonet fitting of monitor housing into quick disconnect fitting and with valve off, start fuel pump.

3 Turn valve to flush and flow approximately one gallon of fuel.

4 Position valve to test and flow suitable sample through monitor holder unit while the system being tested is under continuous flow condition.

5 Turn valve off prior to stopping system flow.

6 Remove test equipment from disconnect coupling. Continue to step 6.

(e) Accomplish the following test using monitor housing without flushing provisions:

1 Install empty monitor cartridge in holder.

2 Insert bayonet fitting of monitor housing into quick disconnect fitting and start fuel pump.

3 Flow approximately one gallon fuel through monitor.

4 Remove monitor housing from disconnect coupling (fuel pump may be shut off if desired), remove empty cartridge and install field monitor (grid side down). Check that monitor has filter membrane and backup pad.

5 Insert monitor into sampling coupling and flow suitable sample through monitor holder while the system being tested is under continuous flow condition.

6 Remove monitor from sampling coupling and shut off fuel pump. Continue to step 6.

(f) Remove monitor from housing. Mount on syringe (grid side down), making certain that syringe handle is all the way in.

(g) Pull syringe handle all the way out to remove fuel from monitor. Remove monitor before pressing handle inward.

(h) After fuel is removed, replace the colored plastic cap.

(i) Examine membrane to determine if further testing is necessary.

(j) Remove any test fittings from the system (except permanent test fittings) and place system back in normal operating condition.

(k) Evaluate filter membrane as follows:

TEST	FUEL DISPENSED FROM STORAGE	FUEL DISPENSED INTO AIRCRAFT
Color Membrane ASTM D-3830	A2, B2 or G2 3 gallons Dry rating (max)	A2, B2 or G2 3 gallons Dry rating (max)

(l) Retain the filter membrane for evaluation and inspection. The results of all vendor run tests should be retained for one year and be available for inspection by ABX Quality Control.

(m) Filter/separator systems indicating a high level of contamination should be retested, by the above method, after complete flushing of the sampling equipment.

NOTE: Aircraft refueling vehicles which require retesting, due to heavy discoloration and/or a large accumulation of dirt particles on the filter membrane, shall be removed from service. Retesting should be conducted in a manner which would not expose the aircraft to a contaminated product.

NOTE: Questionable vehicle or filter/separator units should not be used to service an aircraft until it has been confirmed by test that clean dry fuel is being delivered to the aircraft.

(4) Fuel sampling.

(a) When it is suspected that fuel in an aircraft tank, refueler or storage facility might be contaminated, proper fuel sampling must be accomplished.

(b) A fuel sample must be a minimum of one gallon.

ABX FUEL MANAGEMENT	REV. NO.: 25 DATE: 05-21-21

FUEL SERVICING PROCEDURES AND PRECAUTIONS

1. Fire Hazards

A. Fueling aircraft involves the transfer of flammable liquids under conditions which are often fire hazardous. Operational requirements make it necessary for fueling crews to perform their duties efficiently and quickly under all types of weather conditions. With increasing fuel capacities to aggravate the problem, it is imperative that basic fire safety procedures are strictly adhered to. It is recognized that there are certain hazards (such as the operation and use of combustion engine servicing equipment and ground power generators or rectifiers in close proximity of the fueling operation) over which positive control cannot be established. Specific cautions are given to these hazards.

B. The vapor densities of aviation fuel are such that released vapors, particularly under calm wind conditions, may travel considerable distances along the ground and collect in depressions where they may not readily dissipate. The concentration of fuel vapors in the area surrounding the aircraft under normal atmospheric conditions depends on wind velocity and the rate at which refueling is accomplished. Every effort should be made to prevent fuel spillage, which represents the greatest hazard.

C. Principle ignition sources likely to be present during aircraft refueling are:

(1) Electrostatic sparks.

(2) Operating aircraft engines and auxiliary power units.

(3) Operating automotive equipment and heaters.

(4) Arcing of electrical circuits.

(5) Open flames.

(6) Energy from energized high frequency radar equipment.

(7) Portable electronic devices (mobile telephones, portable radios, pagers).

D. Effective fire prevention measures are directed toward the elimination or control of spillage, release of excessive vapors, and ignition sources. (GRH 4.1.6)

E. In the event there is an electrical (lightning) storm in the proximity of the airport, fueling may be continued after assurance that proper bonding has been established; however, fueling should not be commenced if there is a severe electrical storm directly over the airport or within 5 miles of airport. (Ref. GRH 4.1.6)

F. During all fueling operations, fire protection equipment, emergency rescue equipment, approved fire extinguishers must be available.

G. Spill Prevention and Control (Ref. GRH 4.1.6)

(1) Every spill, no matter how small, should be investigated as to its cause so that remedial action may be taken. Employees shall report each spill to supervisory personnel. Every spill should be treated as a potential fire source and the spilled fuel removed by one of the methods detailed in this section. Each spill will have to be treated as an individual case because of such variables as the size of spill, wind and weather conditions, equipment arrangement, aircraft occupancy, emergency equipment and personnel available.

H. Handling Fuel Spills (Ref. GRH 4.1.3)

(1) If the fuel is leaking or spilling from fuel servicing equipment or hoses, release the dead man control and operate the emergency fuel shut-off if necessary. If fuel is leaking or spilling from the aircraft, stop the fueling operation immediately. If the spill is considered a large spill, personnel shall be deplaned in an orderly manner as soon as possible and prior to arrival of the fire department. Do not allow personnel to walk through spilled fuel unless there is no way around the spill. If the fuel is spilled from the aircraft, a thorough inspection must be made to determine the source and that fuel is not trapped in any recess in the aircraft. Supervisory personnel shall be notified immediately to ensure the operation may either be continued safely or halted until the emergency is passed.

(2) All spills must be considered a potential fire hazard. After clean-up of the spill, all involved areas such as cargo bins, concealed wing areas, and wheel wells must be checked prior to putting aircraft back into service.

(a) Small Spills

1 Small spills of Avjet fuel in any direction or involving an area of not more than 10 x 10 foot square and not of a continuing nature are normally not of a critical nature; they must, however, be covered with oil absorbents or emulsion compounds or other such material to remove the spilled fuel. As soon as a spill is observed a fire guard shall be established, vehicles with engines running shall be moved

from the area (all others left as is), and the spill cleaned up. Absorbents used in clean-up shall be properly disposed of. Do not move any equipment or the aircraft through the spill area prior to proper clean up.

(b) Large Spills

1 Spills covering an area in excess of 10 x 10 foot square or of a continuing nature shall be considered a large spill and require immediate action to ensure safety of personnel, employees, and equipment. A fire guard shall be established immediately for surveillance. All equipment with engines running, including re-fueler after hoses have been stowed, shall be removed from the area. All other equipment shall be left as is until the spill has been made safe. Normally, clean up will be accomplished by water washing. If spilled fuel enters any storm sewer, notification must be given to the airport authority. The EPA must be notified of every large fuel spill.

I. Generation, Elimination, and Control of Electrostatic Sparks

(1) An aircraft is similar to any other rubber-tired vehicle, such as an automobile or truck, with regard to its ability to build up a static charge when in movement on the ground or at rest. The difference is principally one of magnitude because of the greater “plate area” of an aircraft. Charges may be generated by the movement of the aircraft with the generation at the point of separation of the tires from the pavement and by air current passing over aircraft surfaces, particularly when such currents carry particles of dust, dry snow, or ice crystals.

(2) The movement of air over the metallic surface of an aircraft insulated from ground (as by rubber tires or while on nonconductive ground surfaces) is normally of little concern from a fire hazard viewpoint except where flammable vapors may be present. The fueling operation provides a source of flammable vapors and also generates static charges caused by friction of fuel flow.

(3) The sudden discharge of a highly electrified cloud by a lightning strike in the vicinity might suddenly release any “bound” charges present on an aircraft insulated from the ground. The charge thus freed might produce an arc of sufficient intensity to be potentially hazardous in the presence of any flammable vapors.

J. Bonding Procedures (Ref. GRH 4.1.6)

NOTE: Use proper bonding procedures to eliminate the electrostatic differential between aircraft and refueler.

(1) Prior to making any fueling connection to the aircraft, the fueling equipment shall be bonded to the aircraft by use of a cable, thus providing a conductive path to equalize potential between the fueling equipment and aircraft. The bond shall be maintained until fueling connections have been removed, thus permitting the reuniting of separated charges that could be generated during the fueling operation.

(2) When a hydrant servicer or cart is used for fueling, the hydrant coupler shall be connected to the hydrant system prior to bonding the fuel equipment to the aircraft.

(3) If fueling is to be done over-the-wing, bond the fuel nozzle to aircraft.

(a) Plug and Jack Nozzle Bonding

1 Where aircraft and fuel nozzles are equipped with “plug and jack,” the nozzle bonding “plug” shall be in positive wiping contact with the aircraft “jack” before the fuel tank filler cap is opened. This bond between the nozzle and the aircraft must be maintained throughout fueling operation.

(b) Clip-Type Nozzle Bonding

1 Where nozzles are equipped with bonding clips, the bonding clip shall first be touched to the tank filler cap before it is opened. This is done to ensure that no difference in electrostatic potential exists between the two elements. The nozzle shall be equipped with a strong bonding cable having a spring clamp which shall be firmly attached to a bonding post or other uninsulated metallic part of the aircraft, and this contact must be maintained throughout the fueling operation.

NOTE: The fuel nozzle must not have any hold-open device on the VALVE handle. Disconnect bond in reverse order on completion of fuel servicing.

K. Fueling With Aircraft Engine Running

(1) Normally fuel servicing shall not be done until the aircraft engines have been shut down.

(2) Should it be necessary to refuel an aircraft with an engine running for electrical power or subsequent start, these general rules will apply:

(a) A qualified crew member or taxi qualified mechanic shall be in the cockpit with intercom communications to ground personnel and aircraft radio frequency turned to ground control.

(b) A fire guard shall be stationed near the fueling port of the aircraft. He will be in direct communication with the cockpit and have an approved fire extinguisher under his control.

(c) Refueler personnel shall be located in the immediate area of the refueling equipment and aircraft fueling port, and be in full view of the fire guard.

(d) The engine which is to be left running should be on the side opposite the fueling port with the aircraft parked in such a way to position the running engine upwind of the fueling port and refueling equipment.

(e) Ground control will be notified prior to the start of engine running refueling and be given the type of aircraft, its location, and other pertinent comments. Ground control will be notified at the completion of the refueling operation.

L. Fueling Procedures With Crew and Supernumeraries Onboard

(Ref. GRH 4.1.2, GRH 4.1.3, GRH 4.1.4, GRH 4.1.5, 4.1.6, 4.1.7)

(1) Boarding ladder must be in position and kept clear for personnel to exit aircraft in the event of an emergency during fueling operations.

(2) The fueler, mechanic, or ground personnel will notify personnel onboard aircraft when fueling begins and ends.

(3) Fueler, mechanic, or ground personnel notifies personnel onboard when a hazardous condition exists and when there has been a fuel spill.

(4) Fueler, mechanic, or ground personnel should ensure in-use fuel hose is protected from damage during fueling operations.

(5) The fueler, mechanic, or ground personnel will notify rescue and fire-fighting service in the event of a fire, major fuel spill, or any other hazardous condition. (GRH 4.1.7)

M. Automotive Equipment (GRH 4.1.4)

(1) Motor vehicles shall not be operated in close proximity of fueling operation in such a manner as to make them backfire or emit sparks from exhaust.

(2) No automotive equipment or ground power unit shall be parked under the wings of aircraft or within 6 feet of the trailing edge so that any spilled fuel can run off and come in contact with equipment.

(3) Equipment shall not be parked in such a manner as to block the path of refueling trucks, hydrant carts, or aircraft should it be necessary to move them in an emergency.

(4) External heaters shall not be used in close proximity of fueling operation, and wind conditions must be considered carefully.

NOTE: External heaters may be in operation during refueling providing the heater is operating properly and there are no sparks coming from the exhaust. The heater will not be operated under conditions of calm winds or small velocity winds blowing directly from refueling point towards the heater.

N. Prevention of Arcing of Electrical Circuits

(1) Aircraft batteries shall not be connected or disconnected during fuel servicing.

(2) Ground power units shall not be parked under wings or within 6 feet of trailing edge of wings. Units shall not be connected or disconnected during fuel servicing.

(3) Flashlights used for fueling shall be of the type approved by the Bureau of Mines for use in hazardous locations.

(4) Photographic flash bulbs or electronic flash equipment shall not be used within 10 feet of refueling equipment or of fill or vent points of the aircraft.

(5) No maintenance shall be performed during fueling that could cause any arcing or sparks from any source.

(6) During fueling operations, portable electronic devices (such as mobile telephones, portable radios, pagers, laptops) should not be used in a radius of at least 10 feet from the filling and venting points of the aircraft, hydrant pit, fueling vehicle and its hoses in use.

O. Open Flames

(1) No smoking shall be permitted on ramp area. Servicing vehicles shall be plainly marked with 3-inch letters on a sharply contrasting color background with the type or product name of fuel being handled.

(2) No welding or cutting torches, flare pots, or any other open flame shall be used within 150 feet of aircraft during fueling operation. (Wind direction and velocity must also be considered.)

(3) Persons engaged in fueling operations shall not be permitted to carry “Strike Anywhere” matches or lighters.

P. Control of High Frequency Radar Equipment

(1) All radar equipment shall be off during fueling operation of any aircraft on the ramp. If radar equipment is to be ground tested, the beam shall not be directed toward any fueling operation, fuel loading, or storage or tank farm.

2. Fire Hazard Properties of Aviation Fuel

A. The principle factors of concern in determining the fire hazard properties of aviation fuels are:

(1) Susceptibility To or Ease Of Ignition

(a) Flash Point

1 The flash point of standard grades of aviation gasoline has been established at approximately minus 50 degrees F. at sea level by the closed-cup method. The flash point of JET B turbine fuel is not regulated by specification but samples have been tested by the closed-cup method and found to be in the range of from minus 10 degrees F. to plus 30 degrees F. at sea level. Most of the JET A (kerosene grade) turbine fuels have flash points in the range of plus 95 degrees F. to plus 145 degrees F. (closed-cup) at sea level.

2 In an air saturation test method using open flame, flash point determinations have produced figures significantly lower than those produced by the closed-cup method. For instance, by this method, the flash points of aviation gasolines ranged from minus 75 degrees F. to minus 85 degrees F. and JET B turbine fuel goes down to minus 60 degrees F.

3 From this information it may be observed that aviation gasoline and JET B turbine fuel at normal temperatures and pressures will give off vapors which are capable of forming ignitable mixtures with the air near the surface of the liquid or within the vessel in which the liquid is stored. Kerosene grades of turbine fuels (JET A) are out of this range at normal temperatures and pressures, but where a JET A turbine fuel may be heated above its flash point, the vapors may be capable of forming ignitable mixtures. This condition may develop where ambient temperatures are in 100 degree F. range for extended periods.

4 In evaluating the potential flammability of fuel-air mixture in a tank under a given temperature condition it should be remembered that the temperature of the fuel inside the tank may be quite different than the ambient temperatures being experienced.

(b) Flammability Limits

1 The lower limit represents the minimum concentration while the upper limit defines the maximum amount of fuel vapors in the air that will permit combustion. The generally accepted flammability range by volume for most gasolines is 1.4 percent to 7.6 percent. The average figures for JET B turbine fuels are 0.8 percent to 5.6 percent. The average figures for kerosene grade (JET A) turbine fuels are 0.6 percent to 4.9 percent.

2 There is relatively little significance in the variations indicated for the range between the lower and upper limits of these products, as there is only about 2 percentage points variation between the least volatile fuel (JET A turbine fuel) and the most volatile (aviation gasoline).

3 More significant is the temperature range during which it may be possible to have such flammable vapor-air mixtures. At sea level in a storage tank this temperature range for aviation gasoline would be from about minus 50 degrees F. to plus 30 degrees F.; for JET B turbine fuels the

range would be from about minus 10 degrees F. to plus 100 degrees F.; and for the kerosene grades (JET A) turbine fuels from plus 95 degrees F. to plus 165 degrees F. It can be seen that the JET B turbine fuels represent the most practical hazard under normal temperature conditions.

4 As vented tanks are drained, air enters, and during such periods the flammable vapor conditions may change drastically. The same change occurs in aircraft which descend from altitude. These facts are important in assessing the degree of hazard which may exist in a tank containing fuel.

5 Under aircraft crash impact conditions where “fuel mists” are created following tank failures, all of the fuels are readily ignitable. Under these conditions, fuel in “mist” form presents a hazard equal to fuel in vapor form as far as reaching the flammability limits of the fuel are concerned.

(c) Vapor Pressure

1 The vapor pressure of these fuels is the pressure of the vapor at any given temperature at which the vapor and liquid phases of the substances are in equilibrium in a closed container. Such pressures vary with the temperature but, most commonly, information on hydrocarbon mixtures is given where the pressures are measured at 100 degrees F. The Reid Vapor Pressure is between 2.0 and 3.0 lb/sq. in. absolute. JET A (kerosene grade) turbine fuels are about 0.1 lb./sq. in. absolute.

2 The significance of vapor pressure characteristic of the three grades of fuel is that the standard grades of aviation gasoline do give off flammable vapors in ignitable amounts at normal temperatures and pressures. When these vapors are confined, the vapor air mixture over the liquid surface most frequently will be within the flammability range. This means that ignition of JET B turbine fuel vapors either within or exterior to a tank may cause violent combustion within the confined space if flame enters. The JET A (kerosene grade) turbine fuels do not give off flammable vapors in ignitable amounts unless the fuel temperature is above 95 degrees F.

(d) Autoignition (Flashpoint) Temperature

1 The autoignition temperature is the minimum temperature of a substance required to initiate or cause self-sustained combustion independently of any sparks or other means of ignition.

2 Under one set of test conditions standard grades of aviation gasoline have ignition temperatures approximately 840 degrees F. Turbine fuels have ignition temperatures among the lowest found for hydrocarbons and considerably lower than those for aviation gasoline. For instance, the autoignition temperature of a JET B turbine fuel was measured using the same test procedure at approximately 480 degrees F. A kerosene grade (JET A) turbine fuel under the same test method was found to have an autoignition temperature approximately 475 degrees F. Temperatures in this range may exist for a considerable period in turbine engines after shut down or on brake surfaces following hard use.

(e) Distillation Range

1 The initial and the end boiling points of standard grades of aviation gasoline are approximately 110 degrees F. and 325 degrees F. The initial boiling point of JET B turbine fuels is about 135 degrees F. and the end point is 485 degrees F. The only marked difference in the distillation ranges of the three fuels under consideration concerns JET A (kerosene grades of turbine fuels which have initial boiling points of about 325 degrees F. and end points of about 450 degrees F.).

2 This factor, along with the flash points and vapor pressures of the fuels, indicates the relative volatility of the fuels; the initial and end boiling points show the overall volatility of a fuel through its entire distillation range; the flash point and vapor pressures measure the initial tendency of the fuel to vaporize. It can be seen that aviation gasoline and JET B turbine fuels have wider ranges.

(f) Electrostatic Susceptibility

1 The degree to which a static charge is acquired and built up by aviation fuels depends on many factors such as fuel type, amount and type of impurity, linear velocity, type and condition of charge separating surface, and presence of extraneous materials like water, air, sludge, tank scale, and treating reagents.

2 JET B and JET A turbine fuels by their very nature generally retain more impurities than aviation gasolines and are thus more prone to acquire a static charge.

B. Fire Severity After Ignition

(1) Heat of Combustion

(a) The net heat of combustion of gasoline is normally quoted at about 19,000 BTUs/lb. For JET B turbine fuels the average is roughly 18,700 BTUs/lb., while the JET A (kerosene grades) of turbine fuels is approximately 18,600 BTUs/lb.

(b) From these figures it can be readily seen that there is little difference in the heat of combustion between these various hydrocarbons which would be of significance from the fire safety point of view.

(2) Rate of Flame Spread

(a) Where quiescent pools of spilled fuel exist, there is a marked difference in the rates of flame spread over pools of JET A (kerosene grades) of turbine fuels as compared with the other two types. Under these conditions, a direct relationship exists between the rate of flame spread and the vapor pressures of the materials. For instance, aviation gasolines and JET B turbine fuels have been calculated to have a rate of flame spread of between 700 feet to 800 feet per minute, whereas the rate of flame spread for JET A turbine fuels under the same conditions is substantially lower and is less than 100 feet per minute. This is an important factor in evaluating the severity of the fire hazard encountered under these conditions and is also a factor which would affect the ease of fire control under similar conditions.

(b) This slower rate of flame propagation for JET A (kerosene grade) turbine fuels does not hold, however, where the fuel is released as a “fuel mist” as is frequently the result of aircraft impact accidents, or where the fuels are heated to or above their flash point. If a flammable liquid is in “mist” form or is at a temperature above its flash point, the speed of flame spread in the “mist” or vapor will be essentially the same regardless of the liquid spilled.

C. Fire Control Factors

(1) Specific Gravity

(a) The specific gravity of a material is commonly expressed as related to water at 60 degrees F. All these fuels are lighter than water. The specific gravity of aviation gasolines is normally quoted at about 0.70, JET B turbine fuels at about 0.78, and the JET A (kerosene grade) fuels at about 0.81.

(b) This means that as far as fire control is concerned, all of the fuels will float on water. This may be a handicap during fire operations under certain conditions where sizable quantities of spilled fuel may be involved.

(2) Solubility In Water

(a) All three of the fuels are essentially nonsoluble in water. Fires involving all three fuels can be handled with regular foam concentrates (as opposed to alcohol types). U.S. Specification on all various aviation fuels are such that control is established over the additives making it possible to use regular foam concentrates without concern for abnormal foam breakdown because of anti-icing or defoaming constituents in the fuel.

(b) The amount of water that may be entrained in the fuel due to water contamination is not particularly significant from a fire hazard viewpoint except that the amount of water increases the static generation hazard of the fuel.

ABX FUEL MANAGEMENT	REV. NO.: 22 DATE: 10-04-16

FUELING/DEFUELING

1. General

A. The servicing of an aircraft with fuel is an operation requiring, for the safety and protection of the operator and the equipment, the exercise of the utmost care and accuracy. If fuel is dispensed from automotive equipment, every precaution must be exercised in its operation to ensure that no damage occurs through collision with the aircraft, personnel or ramp equipment. Care and deliberation are fundamental requisites of safety and efficiency in the operation.

(1) It is mandatory for all line service personnel performing fuel servicing to wear hearing protection while working around aircraft.

B. Aviation fuel may cause irritation and blistering if it comes in contact with the skin. Should clothing become dampened with fuel, it should be removed and the affected skin area thoroughly washed with soap and water.

C. When the upper filler cap of the fuel tank is removed for refueling or venting purpose, care must be taken that no items carried on the person might fall into the tank. During rain or snow conditions the tank filler opening must be protected so that moisture cannot enter.

CAUTION: IT IS NOT NECESSARY FOR THERE TO BE A GROUNDING WIRE. A GROUNDING WIRE CARRIES NO CHARGE AT ALL WHEN THE AIRCRAFT AND THE TRUCK ARE BONDED.

D. The refueler and aircraft must be bonded before fueling is started and remain bonded until after servicing is completed (see Section 07, paragraph 1.J.).

E. During all fueling operations, fire protection equipment, emergency rescue equipment, approved fire extinguishers must be available.

CAUTION: THE HOSE FROM THE REFUELER SHALL NOT BE CONNECTED TO THE AIRCRAFT FUELING ADAPTER UNTIL THE REFUELING PROCESS IS TO BEGIN. THE HOSE SHALL NOT BE CONNECTED AND LEFT UNATTENDED.

CAUTION: THE SERVICEMAN MUST BE IN POSSESSION OF THE DEADMAN CONTROL ON THE REFUELER AND BE ABLE TO OBSERVE THE METER AND GAUGE READINGS. THE SERVICEMAN SHALL ALSO OBSERVE THE ENTIRE FUELING OPERATION AND BE READY TO SHUT IT DOWN IN THE EVENT OF LEAKS, SPILLS, OVERFLOW, FIRE, OR MECHANICAL MALFUNCTION.

CAUTION: IN THE EVENT OF LEAKS OR ANY SPILL, THE SERVICEMAN SHALL BE RESPONSIBLE TO POST A FIREGUARD AND MAKE NOTIFICATION TO CORRECT THE DISCREPANCY.

CAUTION: IN THE EVENT OF A LARGE FUEL SPILL ALL EQUIPMENT WITH ENGINES RUNNING SHALL BE REMOVED FROM THE AREA IF PRACTICAL, ALL OTHER EQUIPMENT SHALL BE LEFT AS IS. IF AN ENGINE IS TO BE SHUTDOWN, SLOW TO IDLE AND THEN SHUT DOWN.

F. Servicing shall not begin unless the service crew has in its possession a written statement of the exact amount of fuel to be added or removed from the aircraft or verbal communication with the cockpit crew on volume and distribution of the fuel uplift.

WARNING: THROUGHOUT ANY OR ALL FUEL SERVICING PROCEDURES, ABSOLUTELY NO SMOKING SHALL BE PERMITTED IN OR ABOUT THE AIRCRAFT.

G. External power shall not be applied or removed during refueling. If external heaters are operating, consideration to wind direction and velocity must be given before starting to refuel. Determine there is no open flame within the proximity of the aircraft or refueling equipment. The APU may be in operation for all refueling.

CAUTION: PRIOR TO ANY REFUELING OR DEFUELING OPERATION, OBSERVE ALL THE PRECAUTIONS AND NOTES THAT APPLY TO THE SERVICING PROCEDURES FOR EACH TYPE AIRCRAFT.

ABX FUEL MANAGEMENT	REV. NO.: 22 DATE: 10-04-16

H. In addition to the servicing procedures for each type aircraft, the following will be adhered to:

(1) When the fueling is completed the total fuel added in pounds converted to gallons must agree with the refueler meter reading. Report any appreciable discrepancy to the supervisor. These computations should take into account fuel density compensation/temperature correction (refer to Turbine Fuel Weight Charts).

(2) The aircraft fuel tanks will hold more fuel than allowed when using standard fuel loads. Standard fuel loads are normally used so that stations may more readily compute gross weight and take-off C.G. When an aircraft is serviced in excess of a standard fuel load, the total fuel load and its distribution must be reported to station operations or cockpit crew. If the gross weight or C.G. cannot be adjusted to meet takeoff requirements, the aircraft must be defueled to a specified load.

I. Fuel caps and covers.

(1) After the fueling operation is completed, it is the serviceman's responsibility to ensure all tank caps and all covers are closed and secured.

(2) Install cover on pressure fueling adapter(s). Place panel power switches “OFF”, close and properly latch the panel fairing cover (see applicable aircraft procedures).

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ABX FUEL MANAGEMENT	REV. NO.: 14 DATE: 10-06-09

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ABX FUEL MANAGEMENT	REV. NO.: ORIG DATE: 05-03-02

AVGAS AND AUTOMOTIVE FUEL

1. General

A. Aviation gasoline and automotive grade fuels require the same procedures for handling and storage and the same general precautions shall be followed as outlined for turbine fuels with the following exceptions:

(1) Settling time shall be 15 minutes per foot of depth in storage systems.

(2) Standpipe may be used in the storage facility in place of the floating suction. The standpipe must extend 6 to 8 inches above bottom of tank.

(3) Fuel need only be filtered prior to servicing into equipment.

(4) All other safety and accountability procedures apply.

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ABX FUEL MANAGEMENT	REV. NO.: ORIG DATE: 05-03-02

SWITCH FUELING

1. General

A. Switch fueling denotes the practice where fuels having a flash point of less than 100 Degrees F. are mixed with fuels having a flash point above 100 Degrees F. by either the addition of a higher flash point fuel to a lower flash point fuel or vice versa.

B. If a low temperature flash point fuel such as Jet A-2, Jet B, JP-4 or Avgas (alternate or emergency fuel) is to be used or has been added at the last fueling, special switch fuel loading procedures shall be used. The flash point is the point at which vapors will readily form and when mixed in a proper ratio with air will support combustion. The only thing lacking to cause an explosion or fire is ignition which is generally caused by electrostatic charging of the fuel during the fueling process. The rate of flow through pumps, filters, piping, hoses and nozzles causes electrical charges to build up, reduced flow rate or conductivity additives (ASA-3 or equivalent) allows charges to dissipate to ground. Thus, proper aircraft grounding is essential for all refueling. Maintenance Control must know in advance or be notified if an alternate or emergency fuel is used so that necessary fueling precautions and procedures are applied. If the alternate fuel contains a conductivity additive (ASA-3 or equivalent) no special handling is required. If no conductivity additive is used the fuel message will indicate to apply the following switch fuel loading procedures:

(1) Properly ground aircraft and refueler.

(2) Reduce the rate of fuel flow to 1/2 (one-half) of filter rating gallons per minute (GPM) capacity. Accomplish by using low RPM on truck refueler or adjusting supply to hydrant cart.

(3) If fueling overwing, nozzle must extend into the fuel to avoid splashing.

C. Fuel flash point values are as follows:

(1) Flash point 100 Degrees F. and above:

(a) Kerosene (EMS-64) (100 Degrees F.)

(b) Jet A & A - 1 (ASTM D-1655) (ES-2) (100 Degrees F.)

(c) Jet A (3 GP 23) (H) (100 Degrees F.)

(d) JP-5 (MIL-J-5624) (145 Degrees F.)

D. Flash point below 100 Degrees F.:

(1) Jet A-2 (CAN 2-3.23) (92 Degrees F.)

(2) Jet A-2 has a flash point of 92 Degrees F. Although this is an alternate fuel, normal fueling procedures may be used providing outside air temperature does not exceed 86 Degrees F.(30 Degrees C.) With temperatures above this limit, switch fueling procedures must be applied.

(3) Jet B (ASTM D-1655) (-20 Degrees F.)

(4) JP-4 (MIL-J-5624) (3 GP 22) (-20 Degrees F.)

(5) Aviation gasoline (-71 Degrees F.)

NOTE: These switch fueling guidelines are based on the theory that an ignition hazard should not be present when fuel is handled at temperatures below its flash point and may be present when handled at temperatures above its flash point. Therefore, the fuel specification minimum flash point value is used as the fuel temperature which establishes when refueling rate should be reduced if switch fueling under the conditions described above. However, it is known from laboratory tests using different flash point measurement methods that flash point variations up to 10 Degrees F. (6 Degrees C.) have been obtained. Other tests under fuel spray conditions have indicated that the flash point as measured by a standard laboratory method may be about 20 Degrees F. (11 Degrees C.) higher than the lower flammability temperature limit of the fuel. This data indicates that the fuel specification minimum flash point value may not always represent the lowest fuel temperature at which flammable fuel/air vapors can form. Full scale refueling tests have not been conducted to investigate any effects of the laboratory test results, but it is suggested in view of the laboratory results that consideration be given to employing the witch fueling guidelines at fuel temperatures 10-20 Degrees F. below the flash point value if operational conditions permit.

ABX FUEL MANAGEMENT	REV. NO.: 6 DATE: 12-07-04

FUEL TANK TREATMENT FOR MICROBIOLOGICAL GROWTH

1. General

A. Microorganisms existing and growing in the water in fuel systems derive their essential food and minerals from the fuel and water interfaces where they concentrate. These microorganisms may appear as a dark sludge in the sump drainings and can cause filter clogging. Others attach to the structure and secrete acids during growth which cause corrosion and eventual structural failure. Forming on fuel quantity probes as a mayonnaise-like deposit, microorganisms can cause the gauges to be erratic and indicate high or low amounts of fuel.

B. Biobor JF, made by the U.S. Borax and Chemical Corp., is a fungicide which is used to kill the microorganisms which exist in aircraft fuel systems. Biobor JF may either be mixed with the fuel in tank (batch blending) or be injected while fuel is being pumped on board from a refueler.

C. Since an excessive amount of Biobor JF may be detrimental to the turbine engine and an insufficient amount will not kill the microbiological growth, it is very important that the exact amount be used to obtain the desired concentration.

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AIRCRAFT FUEL TANK SUMP DRAINING

1. General

Sumping shall be accomplished at each maintenance check (Service Check and higher). To give free water the longest possible time to settle out of fuel and collect in the lowest point in the tank, the sumps shall be drained just prior to moving the aircraft. If the aircraft is to be fueled, the sumps shall be drained before the aircraft is fueled. Sump draining at non-maintenance stations shall be done only by special request.

2. Sump Draining Procedures

A. After the aircraft has remained in a static position for a minimum of one (1) hour, drain all fuel tank sumps. If more than one (1) hour ground time is available, allow fuel to settle as long as schedule permits prior to sumping.

B. Use appropriate sump bottle with drain attached.

C. Drain a minimum of two (2) quarts from each sump.

D. Check sump bottle after each draining for water and sediment. A clear sump sample can be all water or all fuel. To distinguish, add a small quantity of water to bottle and observe reaction. If sample is all water no change will be observed. If sample is all fuel the added water will settle to the bottom of the bottle and form a visible interface with fuel.

E. Continue draining as required to remove all water and sediment.

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TURBINE FUEL WEIGHT CHART

Based on Weight of 6.7 Pounds per U.S Gallon. Multiply U.S. Gallons by .833 to obtain Imperial Gallons. Multiply U.S. Gallons by 3.785 to obtain liters.

WGT.	GALLONS		WGT.	GALLONS		WGT.	GALLONS	
LBS.	U.S.	IMP.	LBS.	U.S.	IMP.	LBS.	U.S.	IMP.
500	75	62	2350	351	292	4200	627	522
550	82	68	2400	358	298	4250	634	528
600	90	75	2450	366	305	4300	642	535
650	97	81	2500	373	311	4350	649	541
700	104	87	2550	381	317	4400	657	547
750	112	93	2600	388	323	4450	664	553
800	119	99	2650	396	329	4500	672	559
850	127	106	2700	403	336	4550	679	566
900	134	112	2750	410	342	4600	687	572
950	142	118	2800	418	348	4650	694	578
1000	149	124	2850	425	354	4700	701	584
1050	157	131	2900	433	361	4750	709	591
1100	164	137	2950	440	367	4800	716	597
1150	172	143	3000	448	373	4850	724	603
1200	179	149	3050	455	379	4900	731	609
1250	187	155	3100	463	385	4950	739	615
1300	194	162	3150	470	392	5000	746	622
1350	201	168	3200	478	398	5050	754	628
1400	209	174	3250	485	404	5100	761	634
1450	216	180	3300	493	410	5150	769	640
1500	224	186	3350	500	417	5200	776	647
1550	231	193	3400	507	423	5250	784	653
1600	239	199	3450	515	429	5300	791	659
1650	246	205	3500	522	435	5350	799	665
1700	254	211	3550	530	441	5400	806	671

WGT.	GALLONS		WGT.	GALLONS		WGT.	GALLONS	
LBS.	U.S.	IMP.	LBS.	U.S.	IMP.	LBS.	U.S.	IMP.
1750	261	218	3600	537	448	5450	813	678
1800	269	224	3650	545	454	5500	821	684
1850	276	230	3700	552	460	5550	828	690
1900	284	236	3750	560	466	5600	836	696
1950	291	242	3800	567	472	5650	843	702
2000	299	249	3850	575	479	5700	851	709
2050	306	255	3900	582	485	5750	858	715
2100	313	261	3950	590	491	5800	866	721
2150	321	267	4000	597	497	5850	873	727
2200	328	274	4050	604	504	5900	881	734
2250	336	280	4100	612	510	5950	888	740
2300	343	286	4150	619	516	6000	896	746
6050	903	752	8050	1201	1001	10050	1500	1250
6100	910	758	8100	1209	1007	10100	1507	1256
6150	918	765	8150	1216	1013	10150	1515	1262
6200	925	771	8200	1224	1019	10200	1522	1268
6250	933	777	8250	1231	1026	10250	1530	1274
6300	940	783	8300	1239	1032	10300	1537	1281
6350	948	789	8350	1246	1038	10350	1545	1287
6400	955	796	8400	1254	1044	10400	1552	1293
6450	963	802	8450	1261	1051	10450	1560	1299
6500	970	808	8500	1269	1057	10500	1567	1305
6550	978	814	8550	1276	1063	10550	1575	1312
6600	985	821	8600	1284	1069	10600	1582	1318
6650	993	827	8650	1291	1075	10650	1590	1324
6700	1000	833	8700	1299	1082	10700	1597	1330
6750	1007	839	8750	1306	1088	10750	1604	1337
6800	1015	845	8800	1313	1094	10800	1612	1343
6850	1022	852	8850	1321	1100	10850	1619	1349
6900	1030	858	8900	1328	1107	10900	1627	1355

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WGT.	GALLONS		WGT.	GALLONS		WGT.	GALLONS	
LBS.	U.S.	IMP.	LBS.	U.S.	IMP.	LBS.	U.S.	IMP.
6950	1037	864	8950	1336	1113	10950	1634	1361
7000	1045	870	9000	1343	1119	11000	1642	1368
7050	1052	877	9050	1351	1125	11050	1649	1374
7100	1060	883	9100	1358	1131	11100	1657	1380
7150	1067	889	9150	1366	1138	11150	1664	1386
7200	1075	895	9200	1373	1144	11200	1672	1392
7250	1082	901	9250	1381	1150	11250	1679	1399
7300	1090	908	9300	1388	1156	11300	1687	1405
7350	1097	914	9350	1396	1162	11350	1694	1411
7400	1104	920	9400	1403	1169	11400	1701	1417
7450	1112	926	9450	1410	1175	11450	1709	1424
7500	1119	932	9500	1418	1181	11500	1716	1430
7550	1127	939	9550	1425	1187	11550	1724	1436
7600	1134	945	9600	1433	1194	11600	1731	1442
7650	1142	951	9650	1440	1200	11650	1739	1448
7700	1149	957	9700	1448	1206	11700	1746	1455
7750	1157	964	9750	1455	1212	11750	1754	1461
7800	1164	970	9800	1463	1218	11800	1761	1467
7850	1172	976	9850	1470	1225	11850	1769	1473
7900	1179	982	9900	1478	1231	11900	1776	1480
7950	1187	988	9950	1485	1237	11950	1784	1486
8000	1194	995	10000	1493	1243	12000	1791	1492
12050	1799	1498	14050	2097	1747	16050	2396	1995
12100	1806	1504	14100	2104	1753	16100	2403	2002
12150	1813	1511	14150	2112	1759	16150	2410	2008
12200	1821	1517	14200	2119	1765	16200	2418	2014
12250	1828	1523	14250	2127	1772	16250	2425	2020
12300	1836	1529	14300	2134	1778	16300	2433	2027
12350	1843	1535	14350	2142	1784	16350	2440	2033
12400	1851	1542	14400	2149	1790	16400	2104	1753

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WGT.	GALLONS		WGT.	GALLONS		WGT.	GALLONS	
LBS.	U.S.	IMP.	LBS.	U.S.	IMP.	LBS.	U.S.	IMP.
12450	1858	1548	14450	2157	1797	16450	2455	2045
12500	1866	1554	14500	2164	1803	16500	2463	2051
12550	1873	1560	14550	2172	1809	16550	2470	2058
12600	1881	1567	14600	2179	1815	16600	2478	2064
12650	1888	1573	14650	2187	1821	16650	2485	2070
12700	1896	1579	14700	2194	1828	16700	2493	2076
12750	1903	1585	14750	2201	1834	16750	2500	2083
12800	1910	1591	14800	2209	1840	16800	2507	2089
12850	1918	1598	14850	2216	1846	16850	2515	2095
12900	1925	1604	14900	2224	1852	16900	2522	2101
12950	1933	1610	14950	2231	1859	16950	2530	2107
13000	1940	1616	15000	2239	1865	17000	2537	2114
13050	1948	1622	15050	2246	1871	17050	2545	2120
13100	1955	1629	15100	2254	1877	17100	2552	2126
13150	1963	1635	15150	2261	1884	17150	2560	2132
13200	1970	1641	15200	2269	1890	17200	2567	2138
13250	1978	1647	15250	2276	1896	17250	2575	2145
13300	1985	1654	15300	2284	1902	17300	2582	2151
13350	1993	1660	15350	2291	1908	17350	2590	2157
13400	2000	1666	15400	2299	1915	17400	2597	2163
13450	2007	1672	15450	2306	1921	17450	2604	2170
13500	2015	1678	15500	2313	1927	17500	2612	2176
13550	2022	1685	15550	2321	1933	17550	2619	2182
13600	2030	1691	15600	2328	1940	17600	2627	2188
13650	2037	1697	15650	2336	1946	17650	2634	2194
13700	2045	1703	15700	2343	1952	17700	2642	2201
13750	2052	1710	15750	2351	1958	17750	2649	2207
13800	2060	1716	15800	2358	1964	17800	2657	2213
13850	2067	1722	15850	2366	1971	17850	2664	2219
13900	2075	1728	15900	2373	1977	17900	2672	2225

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WGT.	GALLONS		WGT.	GALLONS		WGT.	GALLONS	
LBS.	U.S.	IMP.	LBS.	U.S.	IMP.	LBS.	U.S.	IMP.
13950	2082	1734	15950	2381	1983	17950	2679	2232
14000	2090	1741	16000	2388	1989	18000	2687	2238
18050	2694	2244	18750	2799	2331	19450	2903	2418
18100	2701	2250	18800	2806	2337	19500	2910	2424
18150	2709	2257	18850	2813	2344	19550	2918	2431
18200	2716	2263	18900	2821	2350	19600	2925	2437
18250	2724	2269	18950	2828	2356	19650	2933	2443
18300	2731	2275	19000	2836	2362	19700	2940	2449
18350	2739	2281	19050	2843	2368	19750	2948	2455
18400	2746	2288	19100	2851	2375	19800	2955	2462
18450	2754	2294	19150	2858	2381	19850	2963	2468
18500	2761	2300	19200	2866	2387	19900	2970	2474
18550	2769	2306	19250	2873	2393	19950	2978	2480
18600	2776	2313	19300	2881	2400	20000	2985	2487
18650	2784	2319	19350	2888	2406			
18700	2791	2325	19400	2896	2412			

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WATER/CONTAMINATION PREVENTION PROCEDURES

1. Water/Contamination Check - Prior to Aircraft Fueling

   A. At scheduled stations, ABX fuel vendors are responsible for fuel quality. No check required before fueling aircraft.

   B. At stations that are visited occasionally (International, International Charter, Domestic or International Diversionary) and ABX has not accomplished a Quality Control audit of the fuel vendor, a white bucket test will be performed before fueling aircraft. (Reference white bucket test procedures in Section 06.)

      (1) If a white bucket test is not performed prior to fueling the aircraft, then the test may be performed post fueling if the fuel source has not been refueled or otherwise compromised. (Reference white bucket test procedures in Section 06.) If the white bucket test fails the post fueling test, the aircraft must be defueled and the fuel tanks sumped prior to refueling.

      NOTE: A Logbook entry is required documenting the results of the white bucket test.

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