

HSAC Recommended Practice (RP) # 2004-02

Jet Fuel Quality Control Procedures

Background

HSAC Member Organizations have experienced a number of aircraft engine related events as a result of jet fuel contamination. With this in mind, the HSAC has researched industry best practices and procedures and applicable references in the development of this Recommended Practice. HSAC members should consider the application of the recommendations in this RP for both design and daily operation of jet fuel systems.

Recommended Practices

1. Responsibilities:

a. Pilots and Helicopter Operators:

(1). Hazard/Non-Conformity reports should be submitted for any fuel system defects and follow-up actions initiated.

(2). Verify before fuel is used that the quality control checks have been completed.

b. Fuel System Owners or Operators:

(1). Ensure a written quality control system covering the minimal requirements in this RP and applicable references/regulations is provided. Included should be necessary forms /checklists used in the routine system checks.

(2). Before approving installation of new fuel systems, review the applicable specifications in the list of references at the end of this document and review the plans with the helicopter operator/Aviation Advisory personnel.

(3). Coordinate inspection of all fuel systems, ensure defects are remedied and hazards reported to helicopter operators.

(4). Ensure properly qualified personnel perform quality control checks and refueling operations.

2. Fuel System Operation Inspection Interval and Inspectors:

a. All refueling systems should be inspected annually as a minimum using an appropriate checklist (sample attached to this text).

b. These inspections may be completed either by the helicopter operator or Aviation Advisory personnel, who also develop follow-up actions to remedy any discrepancies.

3. General System Guidelines:

a. All fuel delivery systems, including portable systems, will be fitted with water blocking filtration.

b. Fuel filter canisters should be clearly marked with the next date of change or inspection cycle, and data recorded in an appropriate inspection record.

c. All filters should be replaced at nominated pressure differentials as annotated on the filter housing or as recommended by the manufacturer, but should be replaced annually.

d. All fuel storage supplies should be allowed to settle 1 hour for each 1 foot of fuel depth before use and samples are taken and checked for water content. When fuel transport tanks have been allowed to settle for 1 hour per foot prior to transfer, no additional settling is required for the main tank.

e. All steel tanks should be lined with an approved epoxy liner unless the tanks are constructed of stainless steel and the preferred tank design should include floating suction.

f. All fuel supply tanks should be installed with a slope and have a sump drain at the tank low point for sampling purposes and a method of checking fuel quantity.

g. The preferred plumbing for fuel systems is stainless steel and connections welded.

h. All fuel system static grounds should have continuity checks performed annually as a minimum.

I. It is recommended that frangible "witness" seals be used on transport tank openings, after filling to allow verification that contents are untampered.

4. Fuel System Sampling Guidelines:

a. All required fuel samples should be completed prior to first refueling of the day.

b. Each of the following should be sampled into an appropriate container, checked for water or other contaminants tank sump, filter, and fuel nozzle.

5. General Fuel System Maintenance and Documentation: The following items should be documented in fuel system quality control records.

a. **Daily:** A Daily Log will be used to record the following items:

(1). Sample and water inspection results from fuel tank sumps, all filters/monitors, and fuel nozzles.

(2). Differential pressure readings, if installed.

b. **Annually:**

(1). The interior of all tanks, tank seals, and pressure relief valves should be inspected, all gauges/pressure relief valves should be calibrated unless the manufacturer specifies differently and fuel filters changed.

(2). Tanks when inspected should include a check for build-up of sediment or evidence of microbial growth. If the tank has an internal epoxy coating, inspect coating for evidence of chipping, flaking, or other deterioration. Maintain a record of tank inspection and cleaning using ATA Form 103.07 or similar.

c. **Hoses:** Hose should be marked as complying with the specifications of API 1529 and maintained in accordance with the hose manufacturer specifications.

d. **Portable Offshore Fuel Transport Tanks:** Information may be obtained from the Code of Federal Regulations (U.S. CFR 49, Part 173.32 and Part 180 subpart G). A 5-year hydrostatic test is required on the transporters. The data plate on the tank should state the test pressure requirement and the tank should be appropriately marked for Jet Fuel use.

Reference Publications

- ATA Specification 103 - Standards for Jet Fuel Quality Control at Airports
- NFPA 407/30A - Aaft Fuel Servicing and Marine Service Station Code for Fuel Storage Tanks
- Oil and Gas Producers (OGP) - Aircraft Management Guide
- API/IP 1581 and 1583 - Specifications and Qualification Procedures for Aviation Fuel Filter/Monitors with Absorbent Type Elements and for Aviation Jet Fuel Filter/Separators
- ASTM D1655 and D1298 - Standard Specification for Aviation Turbine Fuels and Standard Test Method for Density, Relative Density (Specific Gravity), or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method
- 49 CFR and 46 CFR Part 64, Appendix 2
- DOT - Federal Motor Carrier Safety Regulations
- FAA Advisory Circular 150/5230-4 – Aircraft Fuel Storage, Handling, and Dispensing on Airports

Recommended Practices (RP) are published under the direction of the Helicopter Safety Advisory Conference (HSAC), P.O. Box 60220, Houston, Texas, 77205. RPs are a medium for discussion of aviation operational safety pertinent to the energy exploration and production industry in the Gulf of Mexico. RPs are not intended to replace individual

engineering or corporate judgement nor to replace instruction in company manuals or government regulations.
Suggestions for subject matter are cordially invited.

Jet Fuel Quality Control Inspection Checklist

References: See HSAC RP 4004-02, Jet Fuel Quality Control Procedures. These references should be utilized for designing and maintaining fuel systems.

Non-Compliances: Record each non-compliance with a note number and summarize at the end of the checklist in the Summary of Non-Compliances.

Inspection Requirements: Annual Checks should be recorded on this form and retained.

INSPECTION SIGNATURES

Location:		
Inspector	Inspection Interval	Date
Additional Remarks: [] - Check here; use back for comments.		

INSPECTION CHECKLIST

AREA OF INSPECTION	REMARKS	✓ Sat Rating	Reference and/or Frequency
1. GENERAL INFORMATION			
1.1. Name of Installation/Vessel/Base	Contact Name: Phone:		
1.2. Type Base (offshore, airport, heliport)	List Type:		
1.3. Is there a Fuel Procedures Manual for all actions relating to fueling, training, maintenance, and quality control?	Yes or No? Date:		RP 2004-02
1.4. Are procedures followed by the fuel staff?	Yes or No?		
1.5. Is the previous review report available? Discrepancies remedied?	Yes or No? Date:		RP 2004-02 Annual
2. FUEL TANKS			
2.1. Are they constructed of Stainless Steel or interior of epoxy coated carbon steel?	Yes or No?		RP 2004-02
2.2. Transport Tanks:			
2.2.1. Operator/Owner Inspection:		Carbon steel:	RP 2004-02 49 CFR 173 / 180 Semi-annual
		Stainless steel:	Annual
2.2.2. Dept of Transpiration Inspections: Transport Tank Intermediate Inspection? Transport Tank Recertified?	Dates must be recorded on the tank dataplate. ?Yes or No Date: Date:		49 CFR, 180 (G) 2 1/2/ Yrs 5 Yrs.
2.2.3. Are seals on inspection hatches and caps in good condition?	Yes or No?		Monthly
2.3.4. Do tank openings have frangible witness seals to verify contents are untampered?	Yes or No?		RP 2004-02
2.2.4. Is there a method of pressure relief?	Yes or No?		49 CFR

AREA OF INSPECTION	REMARKS	✓ Sat Rating	Reference and/or Frequency
Is it inspected and calibrated?	Date:		Annual
2.2.4. Labeling - proper for Jet Fuel?	Yes or No?		
2.2.5. For multiple tanks, are tanks used in order of receipt, is there a control system?	Yes or No?		Industry Practice
2.3. Bulk Tanks:			ATA 103, 2-11
2.3.1. How often are tanks inspected?	Carbon steel: Stainless steel:		Annual Bi-Annual
2.3.2. Are seals on inspection hatches and caps in good condition?	Yes or No?		Monthly
2.3.3. Labeling - proper for Jet Fuel?	Yes or No?		
2.3.4. Are tanks sloped 1-30 towards the sump drain?	Yes or No?		RP 2004-02
2.3.5. Does it have floating suction or draw pipe located off tank bottom?	Yes or No?		
2.3.6. Is the tank bottom filled, or does it have a down pipe to stop free fall of the fuel?	Yes or No?		
2.3.7. Is clearance under drains sufficient to permit direct drain samples?	Yes or No?		RP 2004-02
2.3.8. Are seals on inspection hatches and caps in good condition?	Yes or No?		Monthly
2.3.9. Do tank openings have frangible witness seals to verify contents are untampered?	Yes or No?		RP 2004-02
2.3.10. Are tanks labeled with fuel type?	Yes or No?		
2.3.11. Are pipelines labeled with fuel type?	Yes or No?		
2.3.12. Bonding: Is tank bonded to ground and continuity checked and recorded?	Yes or No?		ATA 103, 1-8 D Monthly
2.3.13. What method of verifying fuel quantity is available?	Fiberglass rod or tube preferred?		RP 2004-02
2.3.14. Is there a method of pressure relief?	Yes or No?		ATA 103
Is it inspected and calibrated?	Date:		Annual
2.3.15. Are inlet and outlet valves labeled with fuel type? (Not Req'd all regions)	Yes or No?		
3. Pumps:			
3.1. Pump running warning light installed?	Yes or No?		Industry Practice
3.2. Is a non-reversing valve fitted downstream of pump?	Yes or No?		
3.3. Are stop/start buttons adjacent to equipment and within the sight of the refueler and accessible?	Yes or No?		ATA 103, 1-7 E
Is it tested periodically?	Yes or No?		Semi Annual
3.4. Is a pressure gauge fitted to outlet of the pump, is it calibrated and results recorded?	Date:		ATA 103, 1-8 F (2) RP 2004-02 Annual
4. Filters			
4.1. Are filter/separator and/or filter/monitor units installed?	Yes or No?		ATA 103, 1-8 F
4.2. Are records of filter changes on QC records?	Yes or No?		ATA 103, 2-13

AREA OF INSPECTION	REMARKS	✓ Sat Rating	Reference and/or Frequency
4.3. Are filter canisters marked with last date of filter change?	Yes or No? Date:		ATA 103, 2-13 RP 2004-02 Annual
4.4. Are the filters water blocking (mandatory)?	Yes or No?		RP 2004-02 ATA 103, 1-7 B API/IP 1851/1583
4.5. Are the filters/separator units drained daily, inspected, tested for water, samples retained, and results?	Yes or No? Recorded in quality control records?		ATA 103 RP 2004-02 Daily
4.6. Do the filters have automatic air eliminators?	Yes or No?		API 1581 ATA 103, 1-7 B
5. FUEL DISPENSING UNIT			
5.1. Differential Pressures:			
5.1.1. Readings recorded (12-16 psi Maximum)? A reading of zero indicates filter is in bypass and should be replaced.	Recorded in a Log - Yes or NO?		RP 2004-02 Daily
5.1.2. Are filter pressure differential checks completed daily or when the refueling equipment is being used for that day and then recorded?	Yes or No?		RP 2004-02 Daily
5.1.3. Are the gauges calibrated?	Yes or No? Date:		ATA 103, 1-8 F(2) Annual
5.2. Meter: Is the delivery meter calibrated/controlled and results recorded?	Yes or No? Date		ATA 103, 1-8 F(3) Annual
5.3. Pressure Gauge: Is a pressure gauge fitted at dispensing cabinet? Is it calibrated?	Yes or No? Date:		ATA 103, 1-7 L Annual
5.4. Cabinet: Is dispensing equipment exposed or fitted into a cabinet?	Yes or No?		
System located below helideck landing level?	Yes or No?		API RP 2L
5.5. Grounding Cable: Is there a retractable bonding cable fitted and being used?	Yes or No?		
Is it serviceable and continuity checked and recorded?	Continuity less than 0.5 ohm		Weekly
5.6. Hoses			
5.6.1. Is re-fuelling hose in good condition, mounted on a retractable reel?	Yes or No?		Daily
5.6.2. Marked on the hose as API 1529 spec?	Yes or No?		RP 2004-02
5.6.3. Is it replaced in accordance with manuf. or regulatory guidance (maximum of 10 years)?	Yes or No?		
5.6.4. Hose should be dated on the side?	Date:		
5.6.5. Is it checked hydrostatically tested?	Yes or No?		Semi-annual
5.6.6. Is it pressure tested and inspected and results recorded?	Yes or No?		ATA 103, 1-8 Monthly
5.7. Fuel Nozzle:			
5.7.1. Are fuel nozzles capped when not in use?	Yes or No?		ATA 103, 1-8 D
5.7.2. If gravity refueling, does the nozzle have a cone filter fitted, and is it inspected for cleanliness?	Yes or No?		ATA 103, 1-8 Monthly
5.7.3. Do nozzles have grounding cables, continuity checked, and recorded?	Yes or No?		ATA 103, 1-8 Monthly

AREA OF INSPECTION	REMARKS	✓ Sat Rating	Reference and/or Frequency
6. Sampling:			
6.1. Are samples taken from fuel nozzle, filter and tank sump prior to the first refueling of the day, inspected, tested for water, and samples retained / results recorded? Tanks, filters, etc should have any water in sumps drained off if any is shown in the water tests, visual or capsule.	Yes or No?		RP 2004-02 ATA 103, 1-8A (2) Daily
6.2. Are sufficient 1quart wide necked sample jars available?	Yes or No?		ATA 103, C (2) Daily
7. Fire Fighting			NFPA 407
7.1. Is fire fighting equipment available? Fire Extinguisher Type (BC), with minimal size of 30 pounds required.	Yes or No?		API RP 2L NPFA 407
7.2. Are fire extinguishers inspected monthly and tagged?	Yes or No?		ATA 103, 1-8 D Monthly
7.3. Are fuelling personnel trained on equipment use?	Last Date:		Industry Practice Bi-Annual
7.4. Are fire drills conducted periodically and recorded (manned structures only)?	Last Date:		NFPA 407
7.5. Are water detection capsules used and within the expiry life date?	Yes or No? Expiry Date:		
8. QUALITY CONTROL & RECORDS			
8.1. Are quality control checks made in accordance with the previous recommendations for all equipment, fuel sampling, maintenance programs, etc. and documentation of those checks retained?	Yes or No?		
8.2. Are written logs /checklists available to indicate all the required checks are being performed? See previous references for frequencies.	Daily: Monthly: Annual:		RP 2004-02
8.3. Are calibration records available for all the previously noted calibration requirements for all meters, gauges, and pressure relief valves?	Yes or No?		
8.4. Are Fuel Settling Requirements Observed (one hour/foot of fuel depth)?	Yes or No?		RP 2004-02
8.5. Is fuel tested before loading into bulk/transport tanks? Is a record maintained?	Yes or No? Yes or No?		
8.6. Is there a QA program for transport tanks to verify they are sealed on receipt?	Yes or No?		
8.7. Quality records allow tractability back to source of the fuel?	Yes or No?		
9. TRAINING			
9.1. Is there a fuel training & qualification program and are training records available for personnel maintaining the system and conducting refueling?	Yes or No?		
9.2. Is competence checked periodically?	Yes or No? Frequency:		Bi-annual

AREA OF INSPECTION	REMARKS	✓ Sat Rating	Reference and/or Frequency
10. SAFETY			
10.1. Are signs available for: No Smoking, Flammable, etc?	Yes or No?		ATA 103, 1-8D 5
10.2. Are appropriate Materials Data Safety Sheets (Hazardous Material) available?	Yes or No?		Industry Practice
10.3. Is an eyewash station available?	Yes or No?		Industry Practice
10.4. Are spill cleanup/containment supplies available?	Yes or No?		Industry Practice
10.5. Are goggles and gloves worn during refueling operations.	Yes or No?		Industry Practice
SUMMARY OF NON COMPLIANCES Continued on back? <input type="checkbox"/> Yes			
List all non compliances	Recommended Corrective Action		
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