



U.S. Department
of Transportation
**Federal Aviation
Administration**

Advisory Circular

Subject: Aircraft Fuel Storage, Handling,
Training, and Dispensing on Airports

Date: 9/23/2021

AC No: 150/5230-4C

Initiated By: AAS-300

Change:

1 **Purpose.**

This advisory circular (AC) contains specifications and guidance for the storage, handling, and dispensing of aviation fuel on airports. Additionally, this AC provides standards and guidance for the training of personnel who conduct these activities.

2 **Cancellation.**

This AC cancels AC 150/5230-4B, *Aircraft Fuel Storage, Handling, and Dispensing on Airports*, dated September 28, 2012.

3 **Applicability.**

The Federal Aviation Administration (FAA) recommends the standards and guidelines in this AC to develop specifications and guidance for the storage, handling, and dispensing of aviation fuel on airports. This AC does not constitute a regulation and is not mandatory. It is not legally binding in its own right and will not be relied upon as a separate basis by the FAA for affirmative enforcement action or other administrative penalty. However, the following applies:

1. The standards and guidelines contained in this AC are practices the FAA recommends establishing an acceptable level of safety, performance and operation for aircraft fuel storage, handling, training, and dispensing on airports.
2. This AC provides one, but not the only, acceptable means of meeting the requirements of 14 CFR, Part 139, *Certification of Airports*.
3. Use of these standards and guidelines is mandatory for projects funded under Federal grant assistance programs, including the Airport Improvement Program (AIP). See Grant Assurance #34.
4. This AC is mandatory, as required by regulation, for projects funded by the Passenger Facility Charge (PFC) program. See PFC Assurance #9.

Although non-certificated airports are not required to develop fuel standards, the FAA recommends these airports use the guidance contained in this AC to develop such standards for the continued enhancement of aviation safety.

4 **Addendum of Authorized Fuel Safety Training Courses.**

The FAA regards instructional programs that provide line service and supervisory training, as required by 14 CFR §139.321 (e) (1) and (2), as critical to safety on airports.

To ensure this training is complete and effective:

1. Third-party training providers who provide line service training and/or supervisory training will submit their training syllabus to the Administrator for review and a determination of its acceptability.
2. Airport and tenant fueling agents who provide line service training for other than their own airport employees and/or supervisory training will submit their training syllabus to the Administrator for review and a determination of its acceptability.
3. Training syllabus should be submitted to:

Federal Aviation Administration
Manager, Airport Safety and Operations
Attn: Fuel Safety Training
800 Independence Ave., SW
AAS-300, Room 618
Washington DC 20591

The FAA publishes a list of the companies offering courses of instruction in line service training as well as supervisory training that are acceptable to the Administrator.

Because changes may occur more frequently than the schedule for updating the AC, the FAA will review this list on a quarterly basis and post an updated version online as an Addendum to this AC.

The airport operator is responsible for consulting the current listing of acceptable training courses. Likewise, the companies listed in this Addendum are responsible for notifying the FAA of any changes to their training syllabus and the availability of the course(s) offered or to contact information.

5 **Principal Changes.**

The AC incorporates the following principal changes:

1. New definitions and acronyms are added to Appendix A.
2. Added a number of new training requirements throughout the document, such as:
 - a. Diesel Exhaust Fluid (DEF)
 - b. Diesel Particulate Filter (DPF)
 - c. Fuel System Icing Inhibitor (FSII), among others.
3. Updated the format of the document in this version and made minor editorial changes throughout.

Hyperlinks (allowing the reader to access documents located on the internet and to maneuver within this document) are provided throughout this document and are identified with underlined text. When navigating within this document, return to the

previously viewed page by pressing the “ALT” and “ ← ” (left arrow) keys simultaneously.

6 Where to Find this AC.

You can view a list of all ACs at

https://www.faa.gov/regulations_policies/advisory_circulars/. You can view the Federal Aviation Regulations at https://www.faa.gov/regulations_policies/faa_regulations/.

7 Feedback on this AC.

If you have suggestions for improving this AC, you may use the [Advisory Circular Feedback](#) form at the end of this AC.



John R. Dermody
Director of Airport Safety and Standards

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CHAPTER 1. Standards and Resources for Procedures on Fuel Storage, Handling, and Dispensing

1.1 Introduction.

Many standards and resources exist throughout the fueling industry to provide guidance on the proper and safe method for handling aviation fuels.

1.2 Standards.

The FAA uses the standards contained in the current edition of National Fire Prevention Association (NFPA) 407, *Standard for Aircraft Fuel Servicing*, as examples throughout this document. NFPA 407 and other standards and resources provide a standard for the storage and delivery of aviation fuel in an airport environment. NFPA 407 is the generally accepted industry best practice at many airports; however, local fire code and regulations at specific airports may differ. All Part 139 airport operators will identify the standard adopted in their Airport Certification Manual.

1.3 Copies of Standards.

You can order NFPA 407 from:

National Fire Protection Association
1 Batterymarch Park
Quincy MA 02169-7471
1-800-344-3555
<https://www.nfpa.org>

NFPA 407 may also be viewed online from the NFPA website as a read-only document at: <https://www.nfpa.org/aboutthecodes/AboutTheCodes.asp?DocNum=407>.

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CHAPTER 2. Fuel Safety Training

This chapter provides guidance on the development of the supervisory fuel safety and the line service fuel safety training courses. This chapter also identifies the training topics that will be addressed in these courses based on the minimum standards established in 14 CFR §139.321 (b) (1) – (7) and §139.321 (e). Chapter 4 of this AC identifies additional training elements to include in the Supervisory Fuel Safety training course. These requirements encompass the supervisor’s role in training others.

2.1 Introduction.

- 2.1.1 14 CFR §139.321 sets forth the requirements for fuel safety training at certificated airports. These requirements include two distinct types of training for employees of agents handling aviation fuel: (1) supervisory training and (2) line service fuel personnel training. Training performed under the supervisory training program will be obtained by completing an FAA authorized Supervisory Fuel Safety training course. Line service fuel safety training may be provided by (1) a supervisor who has completed the supervisory course or (2) the completion of an authorized line service fuel safety training program. The material and program utilized by a certified supervisor to provide training to their company employees must contain all program elements outlined in paragraph 3.1. The material and program utilized by a certified supervisor to provide training to their company employees does not need to be reviewed or approved by the FAA. 14 CFR §139.321 requires that all fueling agent employees handling aviation fuels must complete fuel safety training (see paragraphs 2.1.3 and 2.1.4 for further details).
- 2.1.2 Incidents and accidents caused by the mishandling of fuels and other hazardous materials are vital concerns of both the FAA and airport operators. The FAA and other local and federal agencies are concerned with improper practices that lead to personnel injuries and damage to property, as well as environmental impacts caused by fuel and lubricant products that are not handled properly. For these reasons, airports certificated under Part 139 must ensure training is received in the areas listed in 14 CFR §139.321 (b) for personnel whose duties and responsibilities involve the handling and storing of hazardous substances and materials.
- 2.1.3 Part 139.321(e) (1) requires “At least one supervisor with each fueling agent must have completed an aviation fuel training course in fire safety that is authorized by the Administrator. Such an individual must be trained prior to initial performance of duties, or enrolled in an authorized aviation fuel training course that will be completed within 90 days of initiating duties, and receive recurrent instruction at least every 24 consecutive calendar months.” Should the local authority require additional training, beyond the regulatory requirement, it is the fueling agent’s responsibility to ensure all training requirements are fulfilled.
- 2.1.4 All other employees who fuel aircraft, accept fuel shipments, or otherwise handle fuel must receive at least initial on-the-job training and recurrent instruction every 24

consecutive calendar months in fire safety from the supervisor trained in accordance with paragraph 2.1.5. Should the local authority require additional training, beyond the regulatory requirement, it is the fueling agent's responsibility to ensure all training requirements are fulfilled. Training for employees may also be completed using an approved line service fuel safety course. The FAA lists supervisory and line service programs currently available nationally in the Addendum, which is updated quarterly. It can be found along with this AC on the FAA's website.

2.1.5 14 CFR §139.321 (b) places the responsibility of determining standards for fueling safety on the certificate holder based on state, local, or municipality fueling regulations. The FAA does not intend this AC to replace airport procedures that are tailored to meet requirements imposed because of the use of special equipment or as a result of local regulations.

2.1.6 This AC provides guidelines in Chapter 6 for submitting a supervisory and/or a line service fueling safety program to the FAA for national acceptance.

2.1.7 General Components of a Fuel Safety Training Program.

2.1.7.1 **General Training Topics.**

The specific training topics included in a supervisory and line service fuel safety course must include, at minimum, the components outlined in the supervisor's and line service training curriculum.

2.1.7.2 **Fire Code in Effect.**

2.1.7.2.1 NFPA 407, *Standard for Aircraft Fuel Servicing*, is a generally accepted best practice at many airports. However, the local fire code and regulations in effect at a specific airport may differ from NFPA 407. Information on local fire codes in effect are a vital component of fuel safety training and are a requirement of both the supervisory and line service program.

2.1.7.2.2 Airport Operators holding a Part 139 certificate should be aware that it is their responsibility to provide the fire code of the public body having jurisdiction over the airport to tenant fueling agents. The airport operator should review and maintain all government required permits for storage and operation.

2.1.8 Handheld Fire Extinguishers.

Each fueling agent supervisor or employee handling aviation fuel must receive hands-on training in the proper use of handheld fire extinguishers every 24 consecutive calendar months. Companies listed in the Addendum must provide this training or highlight the requirement for the student to receive this training from the local fire department or other qualified source. All fuel servicing supervisors and line personnel must complete fire extinguisher training within 60 days (before or after) their initial supervisory or line service training completion date, if it has not been provided by one

of the certified fuel service training courses identified in this AC's Addendum. Fueling supervisors trained to teach hand-held fire extinguisher training may provide this training.

2.1.9 Airport Specific Courses.

An individual airport may create and submit for approval a supervisory or line service course in fuel safety that is specific to an airport using the guidelines in Chapter 6. Such a course may exclude items from paragraph 3.1 that do not apply to that specific airport.

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CHAPTER 3. Required Training Topics

3.1 Mandatory Elements for Supervisory and Line Service Fuel Safety Training Programs.

A fuel safety training program should include:

1. An orientation that addresses:
 - a. Purpose of the course
 - b. Expected outcomes as identified in 14 CFR §139.321(b)
 - c. Familiarity with applicable FAA ACs, fire codes, and fire and fuel safety organizations and their publications
 - d. Knowledge of fuel types and their flash points
 - e. Fueling of different types of aircraft
 - f. Different types of fuel service vehicles and carts
2. Basic safety practices including:
 - a. Protection against fire and explosions
 - b. Safe handling and storage procedures for fuels and lubricants
 - i. Identification and marking of Diesel Exhaust Fuel (DEF),
 - ii. Securing and limiting inventory of DEF, and
 - iii. Fuel System Icing Inhibitor (FSII)

Note: Bulk fluids are generally stored in hangars or storage areas. DEF and FSII are clear and are usually stored in large white plastic tanks ranging from 55 gallons to larger cube storage tanks. If stored close to each other, they are very hard to differentiate from each other without very pronounced markings. To prevent confusion, we recommend:

- Airport operators and fueling agents do not store DEF and FSII fluids in close proximity to each other;
 - Airport operators and fueling agents clearly mark bulk storage tanks or barrels with 4-inch or larger stenciled letters visible from all sides. Use "DIESEL DEF" for all DEF fluid and "JET FUEL SYSTEM ICING INHIBITOR" for FSII storage containers; and
 - Fueling agents or operators should remove jet fuel suspected of being contaminated with DEF from aircraft and discard it. Do not attempt to repurpose DEF-contaminated fuel to other aircraft or vehicles.
- c. An understanding of the term “hazardous materials” and procedures for handling hazardous materials and other fuels and lubricants
 - d. Use of Personal Protective Equipment (PPE) including eye protection, ear protection, hand protection, and proper types of clothing and shoes/boots

- e. Prohibition on carriage of smoking materials (i.e., cigars, cigarettes, lighters, matches, electronic smoking devices (also called e-cigarettes), and pipes)
 - f. First aid for contact with aviation fuels or lubricants, including ingestion, inhalation, and contact with eyes or bare skin
3. Bonding
- a. Definitions as contained in NFPA 407
 - b. Physics of bonding (what/when/why)
 - c. How to ground versus how to bond:
 - i. Where and how to bond
 - ii. Types of bonding equipment
 - iii. Correct bonding procedures
 - d. Static electricity
4. Public protection
- a. Protection from sources of ignition
 - b. Proper ramp fueling procedures including aircraft with passengers on board
 - c. Coordination with flight crew prior to fueling aircraft
 - d. Situations requiring cessation of fueling procedures
 - e. Diesel Particulate Filter (DPF) regeneration system components, operations, and procedures
5. Fire classification and appropriate types of extinguishers
- a. Fire classifications and extinguisher types used
 - b. Rating system used to determine extinguishing capabilities of extinguishers
 - c. Inspections of fire extinguishers
 - d. Safety and personnel protection at a fire or spill incident
 - e. Monthly:
 - i. Confirm the extinguisher is visible, unobstructed, and in its designated location.
 - ii. Verify the locking pin is intact and the tamper seal is unbroken. Examine the extinguisher for obvious physical damage, corrosion, leakage, or clogged nozzle.
 - iii. Confirm the pressure gauge or indicator is in the operable range or position and lift the extinguisher to ensure it is still full.
 - iv. Make sure the operating instructions on the nameplate are legible and facing outward.
 - v. Document the inspection on the monthly tag affixed to the extinguisher.

- vi. Check the last professional service date on the tag. (A certified fire extinguisher maintenance contractor must have inspected the extinguisher within the past 12 months.)
 - vii. Annual fire extinguisher inspections are performed by CERTIFIED personnel.
 - viii. Tags or labels intended for recording inspections, maintenance, or recharging affixed so as not to obstruct the fire extinguisher use, fire extinguisher classification, or manufacturer's labels.
6. Control of access to storage areas
- a. Fences and gates/locks
 - b. Signs and other required placarding (e.g., "No smoking," "Jet A," "AVgas"). See NFPA-407 and NFPA-704 for placards requirements.
 - c. Protection and security associated with fuel farms including proper authorizations and procedures
 - d. Safety awareness (location and operation of fire extinguishers, location of emergency fuel shutoffs, communications for assistance)
7. Fire safety in fuel farm and storage areas
- a. Verification of product types
 - b. Fuel farm inspection procedures
 - c. Fueling operations at fuel storage facilities during low visibility and night operations
 - d. Fuel delivery operations including the use of hoses, valves, and other equipment
 - e. Proper procedures for fuel equipment use/storage (nozzle covers, securing of equipment when not in use)
 - f. Leak and spill prevention
 - g. Product leaks and contamination
 - h. Emergency procedures and notifications
 - i. Follow local spill reporting procedures
 - ii. Use proper PPE in the event of a spill
 - iii. Control spill and containment (limited quantity)
 - iv. Spill (large quantity), contact aircraft rescue and firefighting
 - v. Cleanup procedures
 - i. Effects of weather on fueling operations
8. Fire safety in mobile fuelers, fueling pits, and fueling cabinets
- a. Weight and balance, driving requirements, speed precautions, and driver qualifications

- b. Inspection of fueling vehicle and the sumping, exhaust, muffler system, and knowledge of the DEF system (if the vehicle is so equipped)
 - c. Procedures and vehicle placement for fueling operations, controls, interlocks, brakes, and chocking
 - d. Mobile fueler refueling procedures
 - e. Parking requirements and separation distances
 - f. Fuel hydrant pit safety/procedures/product leaks/clean-up
 - g. DEF regeneration area procedures
 - h. Labeling of self-service dispensing cabinets
 - i. Procedures for connecting and disconnecting to aircraft
 - j. Use of brake interlock override controls
 - k. Emergency fuel shutoff
 - l. Dead Man Control
 - m. DPF regeneration procedures (including access to local DPF regeneration area)
9. Misfueling Prevention Training
- a. Misfueling prevention training should include instruction on:
 - i. Components of a correct fuel order (written or verbal)
 - 1. Aircraft registration (tail) number
 - 2. Type and grade of fuel
 - 3. Volume of fuel and distribution among aircraft fuel tanks
 - 4. Fuel additives to be included as part of the fuel upload
 - ii. Use of Selective-Nozzle spouts and controls for Non-Selective Jet fuel “round/rogue” spouts
 - b. DEF Contamination Prevention
 - i. The purpose and function of DEF.
 - ii. The purpose and function of FSII
 - iii. The identified risk of DEF contamination and stressed importance of maintenance personnel being restricted to handling these fluids
 - 1. Mistaking DEF for FSII and adding it to FSII storage tanks/reservoirs on refueling equipment
- Note:** Bulk fluids are generally stored in hangars or storage areas. DEF and FSII are clear and are usually stored in large white plastic tanks ranging from 55 gallons to larger cube storage tanks. If stored close to each other, they are very hard to differentiate from each other without very pronounced markings. To prevent confusion, we recommend:

- Airport operators and fueling agents do not store DEF and FSII fluids in close proximity to each other;
 - Airport operators and fueling agents clearly mark bulk storage tanks or barrels with 4-inch or larger stenciled letters visible from all sides. Use "DIESEL DEF" for all DEF fluid and "JET FUEL SYSTEM ICING INHIBITOR" for FSII storage containers; and
 - Fueling agents or operators should remove jet fuel suspected of being contaminated with DEF from aircraft and discard it. Do not attempt to repurpose DEF-contaminated fuel to other aircraft or vehicles.
2. Using non-dedicated transfer equipment in the handling of FSII.
 3. Implications of DEF-contaminated fuel.
 4. Procedures for the safe resupply of fueling equipment reservoirs with FSII.
 5. Procedures for the safe resupply of DEF in fueling, ground support, and other equipment requiring its use.
10. Hand-Held Fire Extinguisher Training - All fueling personnel, not just the supervisor, must receive fire extinguisher training every 24 consecutive calendar months. The use of a live fire exercise is not required as part of this training. While extinguishing a live fire does provide the best training, the FAA understands there are limitations imposed in certain localities and will accept classroom training. Such training must include:
- a. Purpose of the fire extinguisher.
 - b. How to identify the classification of extinguisher used for a liquid fuel fire.
 - c. The nomenclature associated with the different parts and components of a fire extinguisher.
 - d. How to inspect of the components of the fire extinguisher for serviceability.
 - e. Proper storage and removal of the extinguisher from the fueling vehicle or fuel cart.
 - f. Demonstration of the proper use/operation of an extinguisher (PASS):
 - i. Pull the safety pin,
 - ii. Aim nozzle at the base of the fire,
 - iii. Squeeze the handle from a safe distance, and
 - iv. Sweep the nozzle from side to side to extinguish the fire.
 - g. Demonstration by all course participants that they can select the appropriate extinguisher based on the type of fire.
 - h. Using a handheld fire extinguisher or realistic training device, and discharging agent from the handheld extinguisher to extinguish the fire.
- Note:** The use of a live fire exercise is not required as part of this training;

however, a realistic training device must be used. Realistic training devices should have the approximate weight and discharge characteristics of the actual hand-held extinguisher used in fuel servicing areas.

Note: For training purpose only, the extinguisher can use water instead of dry chemical.

Note: All fuel servicing supervisors and line personnel must complete fire extinguisher training within 60 days (before or after) their initial supervisory or line service training if it was not provided by one of the certified fuel service training courses identified in the associated Addendum. The fueling supervisor may also have been trained to teach hands-on fire extinguisher training.

Note: Fuel service supervisors can provide extinguisher training if they have been trained and have a class which includes all information found in section 3.1, paragraph 10.

CHAPTER 4. Supervisor's Training Course

Chapter 2 provides the basic elements of the Supervisory Fuel Safety training course. Chapter 3 identifies the additional requirements to meet in the Fire Safety for Supervisors Training Course. The information contained in Chapter 2 must provide enough detail for fueling supervisors to completely comprehend the material and what their responsibilities will be in training others employees. The level of instruction should provide the supervisor the ability to anticipate questions and identify when students are not comprehending the material or demonstrative action to be performed. The FAA recommends that instructors teaching the Supervisor Fuel Training Course possess:

1. A thorough working knowledge of the contents of Chapter 2, Chapter 3, and requirements of 14 CFR §139.321(b)(1) through (b)(7) and §139.321(e) (1) and (2).
2. A minimum of two years of experience in all aspects of fueling procedures.

4.1 **Instructors.**

Instructors teaching the Supervisor Fuel Training Course must be able to discuss training methodologies, apply motivational techniques, and understand how to test student comprehension and recognition.

4.1.1 Supervisory Requirement.

An overview of techniques for effective training, including:

1. Methods of delivery: classroom, on-the-job, and online
2. Understanding of different types of learning (i.e., visual, cognitive, hands-on)
3. Motivational aspects of training.

4.2 **Handheld Fire Extinguishers Training.**

The instructor must ensure each student receives hands-on training in the proper use of hand-held fire extinguishers. Companies listed in the Addendum may provide this training or highlight the requirement for fueling personnel to receive this training from another source considered qualified by the local authority having jurisdiction.

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CHAPTER 5. Testing, Certification, and Recordkeeping

5.1 Exams.

Exams or tests may be oral, written, demonstrative, or a combination. All test questions must be researched and referenced, and a master test retained on file.

5.2 Recordkeeping.

Recordkeeping requirements are provided for under 14 CFR § 139.321. All fueling agents should maintain adequate records to demonstrate:

5.2.1 That at least one supervisor has completed an authorized Supervisor Fuel Safety course, received fire extinguisher training every 24 consecutive calendar months in conjunction with supervisory or previous line-service training.

5.2.2 That in the last 24 consecutive calendar months, all other employees have received training from the supervisor described in paragraph 5.2.1 that includes the topics outlined in Chapter 3 (or have completed an authorized Line Service Fuel Safety course) and received fire extinguisher training.

5.2.3 Continuity of Training.

Fueling agents must retain enough records to demonstrate that continuity of training has been maintained for all employees during the time they are authorized to handle aviation fuels.

5.2.3.1 Demonstration of continuity of training is only required for the previous 24 consecutive calendar months for personnel training records. This may require retaining some records beyond 24 consecutive calendar months.

5.2.3.2 **Example.**

1. Employee A completes all components of supervisor fuel safety training in November 2017 and again in November 2019.
2. During an inspection in April of 2020 the fueling agent would need to produce Employee A's training records for November 2017 and November 2019 to demonstrate continuity of training from April 2018 (24-month lookback).

5.2.3.3 Demonstration of continuity of training can be achieved by maintaining all training records for 24 months. However, other digital storage and reporting functions may be deemed acceptable.

5.2.4 Employees.

Fueling agents must document that new employees have received training on the topics in Chapter 3 and received hands-on training 60 days (before or after) their initial supervisory or line service training if it was not provided by one of the certified fuel service training providers found in the Addendum for this Advisory Circular.

- 5.2.4.1 The tenant fueling agent will provide the airport operator/certificate holder a written confirmation once every 12 consecutive calendar months that the training required by 14 CFR §139.321(e) has been accomplished.

5.2.5 Records of Training.

Records of training must differentiate between supervisor training and line service training.

1. Supervisor documentation must have the following wording:
 - a. Name of company doing the training
 - b. Name of individual who completed the “Fuel Safety Supervisor” training
 - c. “Has successfully completed all classroom and practical application for the requirements of 14 CFR §139.321(b)(1) through (b)(6) and §139.321(e) (1)”
 - d. Date of completion
2. Line training documentation must have the following wording:
 - a. Name of company doing the training
 - b. Name of individual who completed “Line Fuel Service” training
 - c. “Has successfully completed all classroom and practical application for the requirements of 14 CFR Part §139.321(b)(1) through (b)(7) and 139.321 (e) (2)”
 - d. Date of completion
3. The FAA does not endorse any training programs; however, documentation issued as a result of completion of an approved training program in fire safety may include the following:
 - a. A statement indicating the associated training program is on the FAA’s Addendum of approved training facilities.

Note: Records of training for courses that do not include hand-held fire extinguisher training must include a statement indicating “excluding hands-on fire extinguisher training”.

CHAPTER 6. Guidelines for Submitting Line Service and/or Supervisory Safety Course(s)

6.1 Supervisory Training Program and/or Line Training Program.

6.1.1 Purpose.

This chapter establishes the standards for submitting a Fueling Safety Training Program for Supervisory Personnel and/or Fueling Safety Training Program for Line Service Personnel. It provides guidance for addressing the requirements of 14 CFR §139.321 (e) (1) and (2) and the additional requirements for supervisory personnel stipulated by §139.321 (b) (1) – (7).

6.1.2 Explanation.

Fueling Safety Programs ensure supervisory and line fueling personnel recognize the importance of aircraft fueling safety. Fueling supervisory courses are designed to emphasize the importance of instructing effectively in the principles necessary to ensure safety during fueling operations on airports.

6.1.3 Introduction.

Fueling safety involves several areas: aircraft fueling, fuel transport, and fuel storage. Failure to follow safe operating procedures during any of these activities, on and off the airport, can result in accidents. Fueling procedures and practices have been designed to minimize the risks associated with flammable materials for the protection of fuelers themselves, other airport personnel, and the general public. Instruction in this subject is vital and a necessary part of airport safety.

6.2 Supervisors Fuel Training Curriculum.

Ensure the curriculum addresses the contents of Chapters 2, 3 and 4. An outline of the course, testing material, references, and a sample of the course completion certificate (or other means of demonstrating completion) must be submitted to the FAA for review. A Supervisory Fuel Training Curriculum that does not include actual hands-on fire extinguisher training and local airport fire code briefing must clearly indicate that those two items are required components to fully comply with 14 CFR §139.321.

6.3 Line Service Fuel Safety Training Curriculum.

Ensure the curriculum addresses the contents of Chapters 2 and 3. An outline of the course, testing material, references, and a sample of the course completion certificate (or other means of demonstrating completion) must be submitted to the FAA for review. A Line Service Fuel Training Curriculum that does not include actual hands-on fire extinguisher training must clearly indicate that actual hands-on fire extinguisher training is required to fully comply with 14 CFR §139.321.

6.4 **Review and Approval.**

6.4.1 All courses should be submitted for initial approval and whenever there are any major rewrites or changes to the material being taught.

6.4.2 Send curriculum materials to:

Federal Aviation Administration
Manager, Airport Safety and Operations
Attn: Fuel Safety Training
800 Independence Ave., SW
AAS-300, Room 618
Washington DC 20591

6.4.3 The FAA will add acceptable courses to the Addendum of Authorized Fuel Safety Training Courses on a quarterly basis.

APPENDIX A. DEFINITIONS AND ACRONYMS

A.1 Definitions.

1. **Airport Fueling Agent** - An airport operator/certificate holder that sells fuel products on the airport.
2. **Airport Fueling System** - An arrangement of aviation fuel storage tanks, pumps, piping, and associated equipment such as filters, water separators, hydrants and station, or aircraft fuel servicing vehicles, installed at an airport and designed to service aircraft at fixed positions.
3. **Authority Having Jurisdiction (AHJ)** - An organization, office, or individual responsible for enforcing the requirements of a code or standard or for approving equipment, materials, an installation, or a procedure.
4. **Dead Man Control** - A device that requires a positive continual action of a person to allow the flow of fuel.
5. **Emergency Fuel Shutoff** - A function performed to stop the flow of fuel in an emergency.
6. **Fueling Agent** - A person or company that sells fuel products on the airport. This is intended to exclude the self-fueling activities of an airline or corporation that conducts self-fueling.
7. **Self-Fueling and Self-Service** - Self-fueling means the fueling or servicing of an aircraft by the owner of the aircraft with his or her own employees and using his or her own equipment. Self-fueling cannot be contracted out to another party. Self-fueling implies using fuel obtained by the aircraft owner from the source of his/her preference. Self-fueling differs from using a self-service fueling pump made available by the airport, a Fixed Base Operator (FBO), or an aeronautical service provider. The use of a self-service fueling pump is a commercial activity and is not considered self-fueling, as defined herein. Self-service includes activities such as adjusting, repairing, cleaning, and otherwise providing service to an aircraft, provided the service is performed by the aircraft owner or his/her employees with resources supplied by the aircraft owner. Title 14 CFR Part 43 of the Federal Aviation Regulations permits the holder of a pilot certificate to perform specific types of preventative maintenance on any aircraft owned or operated by the pilot.

Note: Fueling from a pull-up commercial fuel pump is not considered self-fueling under the Federal grant assurances since it involves fueling from a self-service pump made available by the airport or a commercial aeronautical service provider.
8. **Tenant Fueling Agent** - A person or company that sells or manages fuel products on the airport, other than the certificate holder.
9. **Airport Fueling System** - Aviation fuel storage tanks, pumps, piping, and associated equipment, such as filters, water separators, hydrants and station, or

aircraft fuel servicing vehicles, installed at an airport and designed to service aircraft at fixed positions.

10. **Fuel Servicing Station** - A unit that includes all necessary equipment to enable the transfer of fuel into or from an aircraft or fueler.
11. **Fuel Dispenser System** - All the pumps, meters, piping, hose, and controls used for the delivery of fuel to, and the removal of vapor from, a vehicle.
12. **Diesel Exhaust Fluid** - A urea-based chemical reductant that is appropriately used in selective catalytic reduction systems on diesel-engine vehicles and equipment to meet stringent emissions standards for nitrogen oxides and particulate matter. Diesel Exhaust Fluid is not approved for use in jet fuel as it reacts with certain jet fuel chemical components to form crystalline deposits in the fuel system. These deposits will flow through the aircraft fuel system and may accumulate on filters, fuel metering components, other fuel system components, or engine fuel nozzles. Aircraft having received DEF-contaminated fuel have experienced clogged fuel filters and fuel nozzle deposits that led to service difficulties, unplanned diversions, and in one case shutdowns of all engines on the aircraft while still in flight.
13. **Fuel System Icing Inhibitor** - An approved aviation fuel additive designed to prevent the formation of ice crystals in fuel system components.

A.2 Acronyms.

AC	Advisory Circular
AHJ	Authority Having Jurisdiction
AIP	Airport Improvement Program
CFR	Code of Federal Regulations
DEF	Diesel Exhaust Fluid
DOT	Department of Transportation
EFSO	Emergency Fuel Shutoff
FAA	Federal Aviation Administration
FBO	Fixed Base Operator
FSII	Fuel System Icing Inhibitor
HOT	Hands-on Training
NFPA	National Fire Protection Association
PFC	Passenger Facility Charge
PPE	Personal Protective Equipment

APPENDIX B. ADDITIONAL RESOURCES**B.1 ATA Spec 103.**

Spec. 103, *Standard for Jet Fuel Quality Control at Airports*, produced by Airlines for America provides guidance for the safe storage and distribution of jet fuel at airports as currently practiced in the commercial aviation industry. Spec. 103 can be obtained from:

A4A Publications Department
1301 Pennsylvania Avenue, NW Suite 1100
Washington, DC 20004
202-626-4062

<https://publications.airlines.org>.

B.2 ASTM Manual 5, *Aviation Fuel Quality Control Procedures*.

Manual 5 provides a complete explanation of several common procedures used by fuel handlers to assess and protect aviation fuel quality. Manual 5 can be obtained by contacting:

ASTM Customer Service
610-832-9585
B-4-9555

service@astm.org

B.3 Addendum of Authorized Fuel Safety Training Courses.

The current Addendum, updated quarterly, is available online with this AC at http://www.faa.gov/regulations_policies/advisory_circulars/.

B.4 FAA Safety Alert for Operators 18015, Jet Fuel Contaminated with Diesel Exhaust Fluid (DEF) SAFO 18015 alerts and advises aircraft operators, Fixed Base Operators (FBO), Federal Aviation Administration (FAA)-certificated repair stations, Flight Standard District Offices (FSDO), and foreign civil aviation authorities that certain aircraft refueled with jet fuel contaminated with DEF or used in refueling equipment that was exposed to DEF. This SAFO is available online at https://www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/safo/all_safos/media/2018/SAFO18015.pdf.

B.5 NTSB Safety Alert, Fuel Providers: Prevent DEF Jet Fuel Contamination.

This NTSB Safety Alert is available online at <https://www.nts.gov/Advocacy/safety-alerts/Documents/SA-079.pdf>.

B.6 Aircraft Diesel Exhaust Fluid Contamination Working Group Collaborative Industry Report on the Hazard of Diesel Exhaust Fluid Contamination of Aircraft Fuel.

This industry report is available online at <https://nbaa.org/wp-content/uploads/aircraft-operations/safety/DEF/20190611-Aircraft-DEF-Contamination-Working-Group-Report.pdf>.

B.7 National Air Transportation Association General Aviation Misfueling Prevention Program.

A misfueling prevention awareness program for pilots, line service professionals, general managers, and customer service representatives. See <https://www.nata.aero/education-and-training/misfueling-prevention-program>.

Advisory Circular Feedback

If you find an error in this AC, have recommendations for improving it, or have suggestions for new items/subjects to be added, you may let us know by (1) mailing this form to Manager, Airport Engineering Division, Federal Aviation Administration ATTN: AAS-100, 800 Independence Avenue SW, Washington DC 20591 or (2) faxing it to the attention of the Office of Airport Safety and Standards at (202) 267-5383.

Subject: AC 150/5230-4C

Date: _____

Please check all appropriate line items:

An error (procedural or typographical) has been noted in paragraph _____ on page _____.

Recommend paragraph _____ on page _____ be changed as follows:

In a future change to this AC, please cover the following subject:
(Briefly describe what you want added.)

Other comments:

I would like to discuss the above. Please contact me at (phone number, email address).

Submitted by: _____

Date: _____