PUBLIC WORKS & CAPITAL PROJECTS

RESOLUTION NO. 2025037

RE: AMENDING THE 2025 ADOPTED COUNTY BUDGET TO FUND THE REMOVAL AND DISPOSAL OF PFAS CONTAINED FIREFIGHTING FOAM AND TO PURCHASE A NEW SUPPLY OF NON-PFAS CONTAINED FOAM AS IT PERTAINS TO THE HUDSON VALLEY REGIONAL AIRPORT

Legislators METZGER, PAOLONI, D'AQUANNI, CASWELL, VERSACI, GORMAN, and KAUL offer the following and move its adoption:

WHEREAS, in November of 2023, the Federal Aviation Administration (FAA) issued guidance for an acceptable firefighting foam that can be used at Part 139 Airports such as Hudson Valley Regional Airport to replace existing firefighting foam that had been used for decades; and

WHEREAS, although the current foam is still acceptable, the Department of Public Works (DPW) is strongly recommending the change to the now FAA accepted alternative, non-PFAS contained foam for the Hudson Valley Regional Airport, and

WHEREAS, should an aviation accident requiring firefighting operations occur, further PFAS contamination would not be a result; and

WHEREAS, DPW is seeking funding in the amount of $50,000 to cover estimated expenses of $27,000 for removal, disposal and cleaning of the old foam and $23,000 for the supply of the new non-PFAS contained foam, and

WHEREAS, accordingly, an appropriation of an interfund transfer is necessary to provide funding for the expenses discussed herein, and

WHEREAS, it is necessary to amend the 2025 Adopted County Budget to provide additional funds to meet the County's obligations and expenses, now therefore, be it

RESOLVED, that the Commissioner of Finance is authorized, empowered and directed to amend the 2025 Adopted County Budget as follows:

APPROPRIATIONS		
Increase		
EA.5610.4611	Refuse Removal	$ 27,000
EA.5610.4123	Safety Supplies	$ 23,000
A.9901.63.9800	EA fund contribution	$ 50,000
Decrease		
A.1990.4007	General contingency	$ (50,000)
		$ 50,000
REVENUES		
Increase		
EA.5610.50310	Interfund Transfers	$ 50,000

APPROVED
Susan Serino
SUSAN J. SERINO
COUNTY EXECUTIVE
Date 3/17/2025

STATE OF NEW YORK
ss:
COUNTY OF DUTCHESS

This is to certify that I, the undersigned Deputy Clerk of the Legislature of the County of Dutchess, have compared the foregoing resolution with the original resolution now on file in the office of said clerk, and which was adopted by said Legislature on the 10th day of March 2025, and that the same is a true and correct transcript of said original resolution and of the whole thereof.

IN WITNESS WHEREOF, I have hereunto set my hand and seal of said Legislature this 10th day of March 2025.

DUTCHESS COUNTY SEAL

Laura Phillips
LAURA PHILLIPS, DEPUTY CLERK OF THE LEGISLATURE

FISCAL IMPACT STATEMENT

☐ NO FISCAL IMPACT PROJECTED

APPROPRIATION RESOLUTIONS

(To be completed by requesting department)

Total Current Year Cost $ 50,000

Total Current Year Revenue $ 0
and Source

Source of County Funds *(check one)*: ☐ Existing Appropriations, ☐ Contingency,
☐ Transfer of Existing Appropriations, ☑ Additional Appropriations, ☐ Other *(explain)*.

Identify Line Items(s):

Related Expenses: Amount $ _____
Nature/Reason:

Anticipated Savings to County: _____

Net County Cost (this year): $50,000
Over Five Years: _____

Additional Comments/Explanation:

In November of 2023, the Federal Aviation Administration (FAA) issued guidance for an acceptable firefighting foam that can be used at Part 139 Airport's (such as Hudson Valley Regional) to replace the existing fire fighting foam that had been used for decades. Although the current foam is still acceptable, DPW is strongly recommending the change to this now FAA accepted alternative, non-PFAS contaminated foam for our operations at Hudson Valley Regional. This will then guarantee, if an aviation accident requiring firefighting operations should occur, that further PFAS contamination would not be a result.

The requested $50,000 would fund approximately $27,000 for removal, disposal and cleaning of old foam and $23,000 for the supply of the new, non-PFAS contained foam.

Prepared by: David C. Whalen DCW Prepared On: 2/4/25

Out pdf

SUE SERINO
COUNTY EXECUTIVE

ROBERT H. BALKIND, P.E.
COMMISSIONER

DAVID C. WHALEN
DEPUTY COMMISSIONER

DUTCHESS COUNTY GOVERNMENT
DEPARTMENT OF PUBLIC WORKS

MEMORANDUM

To: Rachel Kashimer, Deputy County Executive

From: David C. Whalen, Deputy Commissioner DCW

Date: February 4, 2025

Re: RESOLUTION REQUEST – FOR FUNDING TO REMOVE EXISTING PFAS CONTAINED FIREFIGHTING FOAM FROM THE AIRPORT'S FIRE TRUCK, DISPOSE OF SAID MATERIAL, AND CLEAN TRUCK'S TANK; ADDITIONALLY, A SUPPLY OF NEW, NON-PFAS CONTAINING FIRE FIGHTING FOAM WOULD BE PURCHASED

Please find attached a Resolution Request form and Fiscal Impact Statement regarding funding for the removal and disposal of PFAS contained firefighting foam from the Airport's fire truck, cleaning of the truck's tank, and purchasing a new supply of non-PFAS contained foam.

In November of 2023, the Federal Aviation Administration (FAA) issued guidance for an acceptable firefighting foam that can be used at Part 139 Airport's (such as Hudson Valley Regional) to replace the existing firefighting foam that had been used for decades. Although the current foam is still acceptable, DPW is strongly recommending the change to this now FAA accepted alternative, non-PFAS contaminated foam for our operations at Hudson Valley Regional. This will then guarantee, if an aviation accident requiring firefighting operations should occur, that further PFAS contamination would not be a result.

The requested $50,000 would fund approximately $27,000 for removal, disposal and cleaning of old foam and $23,000 for the supply of the new, non-PFAS contained foam.

Please contact me if you have any questions or require additional information.

c: Robert H. Balkind, P.E., Commissioner
Mary Aldrich, MA, CPFO, Director of Budget and Finance
Jeff Durand, Airport Director

U.S. Department
of Transportation
Federal Aviation
Administration

Advisory Circular

Subject: Aircraft Fire Extinguishing Agents for Airports	**Date:** 11/27/2023 **Initiated By:** AAS-300	**AC No:** 150/5210-6E **Change:**

1 **Purpose.**

This Advisory Circular (AC) provides guidance and specifications for reference material covering Aircraft Fire Extinguishing Agents.

2 **Cancellation.**

AC 150/5210-6D, dated July 8, 2004, is cancelled.

3 **Applicability.**

The Federal Aviation Administration (FAA) recommends the guidelines contained in this AC for Aircraft Fire Extinguishing Agents. This AC is not mandatory and does not constitute a regulation. However, the information it contains provides an acceptable methodology for complying with Title 14 of the Code of Federal Regulations (CFR), part 139, Certification of Airports (Part 139). In the event of a conflict, part 139 takes precedence over the other documents identified in this AC.

4 **Principal Changes.**

The AC incorporates the following principal changes:

1. Changed AC title.
2. Added allowable substitutions for extinguishing agents in paragraph 3.2.
   a. Within this section we added the new Military Performance Specification (MIL-PRF)-32725, *Fire Extinguishing Agent, Fluorine-Free Foam (F3) Liquid Concentrate, for Land-Based, Fresh Water Applications.*
3. Added new Appendix A, Supplemental Information.
4. Moved related documents to new Appendix B, Reference Material.
5. Moved definitions to new Appendix C, Definitions and Acronyms, and added new definitions.
6. Added new Figure 2-1, TCA and PCA for Aircraft.
7. Updated the format of the document in this version and made minor editorial changes throughout.

5 **Using this Document.**

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.

The figure in this document is a graphical representation and is not to scale.

6 **Where to Find this AC.**

View a list of all ACs at https://www.faa.gov/regulations_policies/advisory_circulars/. View 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. AGENTS

1.1 General.

This AC provides reference information on these aircraft fire fighting extinguishing agents and their allowable use:

1. Primary agents
2. Complementary agents
3. Other agents

Each fire extinguishing agent has advantages, limitations, equipment requirements, and unique application techniques. Airports should confirm the shelf life of all extinguishing agents in use at their airports.

1.2 Primary Agents.

A primary agent is designed for mass application and rapid fire knockdown. Foams are used for control and extinguishment of aircraft fires involving fuel spills and are produced by incorporation of air into a solution of foam concentrate and water. Their characteristics, as indicated by expansion and drainage rate, are influenced by the amount of mechanical agitation to which the water, foam concentrate, and air are subjected. They extinguish fire by physically separating the fuel vapors from the heat and oxygen necessary for combustion, spreading over the surface of the fuel to effectively suppress vaporization and secure an extinguished area by protecting it from reignition. Foam, being essentially water, cools the surface of the fuel and any metal surfaces in the fire. It is advantageous for a foam blanket to reseal if disrupted, and essential that either the foam has good thermal and mechanical stability or that provision is made by renewing the foam blanket from time to time.

1.2.1 Aqueous Film Forming Foam (AFFF).

Aqueous Film Forming Foam (AFFF) acts as a barrier both to exclude air or oxygen and to develop an aqueous film on the fuel surface that is capable of suppressing the evolution of fuel vapors. The foam produced with AFFF concentrate is dry chemical compatible. Qualified AFFF products are available in 3% and 6% concentrates and mixed with 97% and 94% water by volume, respectively, to create a foam solution upon discharge. The solution drainage forms an aqueous film on most aviation fuels.

1.2.2 Fluorine-Free Foam (F3).

Fluorine-Free Foam (F3), also known as Synthetic Fluorine Free Foam (SFFF), will be known and referred to by the FAA and the Department of Defense (DoD) as only F3 from this point forward.

F3 is a foam concentrate based on a mixture of hydrocarbon surface active agents that are fluorine free. The foam produced with F3 concentrate that are certified to MIL-PRF-32725, *Fire Extinguishing Agent, Fluorine-Free Foam (F3) Liquid Concentrate, for Land-Based, Fresh Water Applications*, and listed on the Qualified Products Database (QPD) is

dry chemical compatible. Qualified F3 products are only currently available in 3% and mixed with 97% water to create a foam solution upon discharge. Due to the absence of fluorosurfactants, F3s are not capable of forming a film to suppress fuel vapors. As a results, F3s suppress fires in only two ways: cooling the fuel with the water component and suppressing the fuel vapors with the foam blanket. Since F3s rely on the foam blanket for vapor suppression, blanket structure and maintenance is critical to maintaining protection. Exposed fuel and areas with minimal blanket coverage will continue to be vapor sources until the blanket has been restored or the fuel is removed. Additionally, F3 foam blankets do not spread like AFFF, meaning disruptions to the foam blanket must be addressed by applying additional foam to the area to maintain vapor suppression.

Safety Notice No. 1

Fluorine-Free Foam (F3)

F3 concentrates are not compatible with other F3 and AFFF concentrates and should never be mixed together in vehicles or storage tanks.

1.3 **Complementary Agents.**

A complementary agent is an extinguishing agent that has the capability to perform fire-suppression functions when used alone or in support of a primary extinguishing agent and where extinguishment might not be achievable using only the primary agent.

1.3.1 Clean Agents.

A clean agent is an electrically nonconducting volatile liquid or gaseous fire extinguishing agent that does not leave a residue upon evaporation and has been shown to provide extinguishing action. Some clean agents are effective on Class A, B and C fires.

1.3.1.1 **Halogenated Extinguishing Agents.**

Halogenated extinguishing agents are hydrocarbons in which one or more hydrogen atom(s) have been replaced by one or more atom(s) from the halogen series — commonly fluorine, chlorine, bromine, or iodine. This substitution confers not only nonflammability but flame extinguishment properties to many of the resulting compounds. Halogenated agents are used both in portable fire extinguishers and in extinguishing systems. Halotron I is a complementary, halogenated extinguishing agent that is approved as an alternative fire fighting agent to Halon 1211 for airport fire fighting use.

Extinguishing mechanisms vary for halogenated extinguishing agents. The primary extinguishing mechanism for Halon 1211 acts by chemically interrupting the continuing combination of the fuel radicals with oxygen in the flame chain reactions. This process is known as "chain breaking." Some halogenated agents act by increasing the heat capacity of

the air within the fire zone. This results in a cooling of the fire by removing the heat the reaction needs to sustain the flame.

Safety Notice No. 2

Halogenated Agents

Halogenated agents will produce acidic gases when discharged onto a fire.

1.3.2 Dry Chemical Agents.

Dry chemical agents include either sodium or potassium based powders intended to extinguish liquid fuel fires. The U.S. airport fire fighting industry relies almost exclusively on the use of potassium-based chemicals as auxiliary extinguishing agents due to their compatibility with AFFF agents and their reliable fire performance. Dry chemicals are the most common complementary agent used; however, they are abrasive, corrosive, and leave a residue.

1.3.2.1 **Sodium Bicarbonate-Based Dry Chemical.**

This agent consists primarily of sodium bicarbonate ($NaHCO_3$) and is suitable for use on all types of flammable liquid and gas fires (Class B), and for fires involving energized electrical equipment (Class C). It is particularly effective on fires in common cooking oils and fats. In combination with these materials, the sodium bicarbonate-based agent reacts to form a type of soap (saponification) that floats on a liquid surface and effectively prevents re-ignition of the grease.

Sodium bicarbonate-based dry chemical is not generally recommended for the extinguishment of fires in ordinary combustibles (Class A), although it can have a transitory effect in extinguishing surface flaming of such materials.

1.3.2.2 **Potassium-based Dry Chemical.**

Commercially available agents are essentially potassium bicarbonate ($KHCO_3$), potassium chloride (KCl), and urea-based potassium bicarbonate ($KC_2N_2H_3O_3$). All three agents are suitable for use on all types of flammable liquid and gas fires (Class B) and also for fires involving energized electrical equipment (Class C). It is generally recognized that salts of potassium are more effective in terms of chemical extinguishment mechanisms than sodium salts in extinguishing Class B fires, except those in deep-fat fryers and other cooking equipment. Dry chemicals based on the salts of potassium are not generally recommended for the extinguishment of fires in ordinary combustibles (Class A), although they can have a transitory effect in extinguishing surface flaming of such materials.

1.4 **Other Agents.**

These agents are typically carried in a handheld extinguisher for a specific application specified by either UL or National Fire Protection Association (NFPA) certification.

1.4.1 Combustible Metal Agents.

Agents used to combat Class D fires, such as magnesium fires, are referred to as combustible metal agents. Heat from the fire causes the powder to form an air-excluding crust. Powders do not cling well to vertical surfaces. Two agents currently approved for use are Metal-X as a dry powder agent and FEM-12 as either a liquid or a dry powder agent.

1.4.2 Carbon Dioxide.

Carbon dioxide (CO_2) is colorless, electrically nonconductive inert gas that is a suitable medium for extinguishing Class B and Class C fires. Carbon Dioxide gas is 1 ½ times heavier than air. Carbon Dioxide extinguishes fire by reducing the concentration of oxygen, the vapor phase of the fuel, or both in the air to a point where combustion stops. NFPA 10, *Standard for Portable Fire Extinguishers* (National Fire Protection Association 2022), § 3.3.3.

Safety Notice No. 3

Carbon Dioxide

In high concentrations, CO_2 can cause unconsciousness and death.

1.4.3 Water Additives.

An agent that, when added to water in proper quantities, suppresses, cools, mitigates fire and/or vapors, and/or provides insulating properties for fuels exposed to radiant heat or direct flame impingement. Water additives can materially reduce water's surface tension and increase its penetrating and spreading abilities; they also might provide enhanced cooling, emulsification, and foaming characteristics. The two most common water additives are wetting agents and encapsulator agents. Wetting agents reduce the surface tension and increase the water's ability to penetrate and spread. Emulsification and foaming characteristics may be enhanced. Encapsulator agents change the chemical make-up of a water droplet with the introduction of spherical micelles to neutralize the fuel. For further information, refer to NFPA 18, *Standard on Wetting Agents* (National Fire Protection Association 2021), and NFPA 18A, *Standard on Water Additives for Fire Control and Vapor Mitigation* (National Fire Protection Association 2022).

CHAPTER 2. AIRPORT INDEXES, AGENT CAPACITIES, AND CRITICAL AREAS

2.1 Airport Indexes.

Use §139.315 to determine the ARFF Index (A through E) for airports serving Department of Transportation (DOT) certificated air carriers/commercial service. Use §139.317 to determine the rescue and fire fighting equipment and agents that are the minimum required for the indexes referred to in §139.315.

2.2 Agent Capacities.

ARFF vehicles are required to come from the manufacturer meeting the regulatory requirements for agent capacity found in §139.317. The FAA recommends airports maintain an equivalent of a 200% resupply for foam and a 100% resupply for complementary agent and propellant.

2.3 Critical Area.

The critical area is an area to be protected in any post-accident/incident situation that permits the safe evacuation of the aircraft occupants. The critical area serves as a basis for calculating quantities of an extinguishing agent necessary to achieve protection in an acceptable time period.

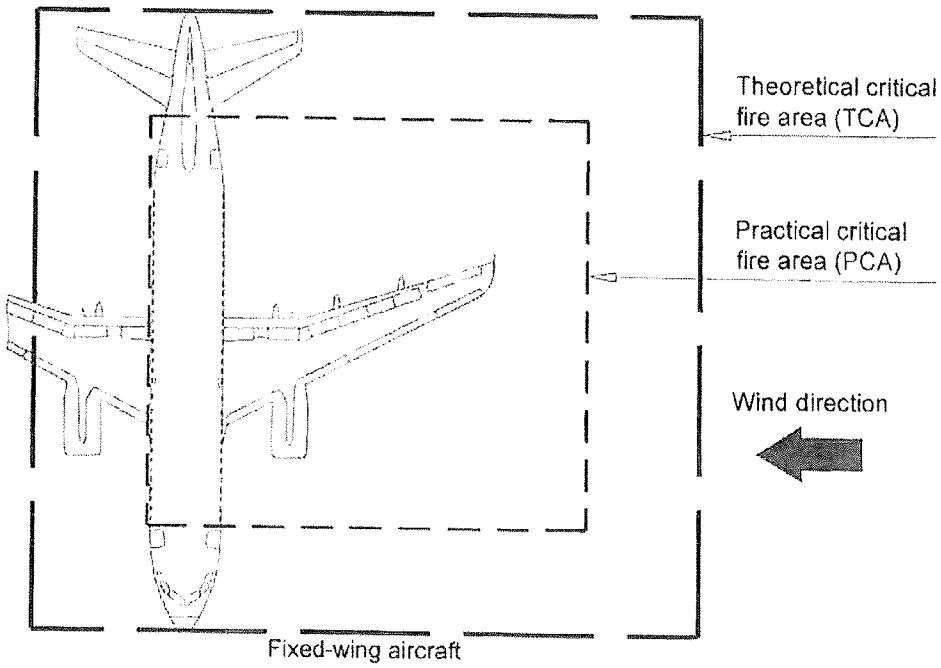
2.3.1 Theoretical Critical Fire Area (TCA).

The TCA serves as a means of categorizing aircraft in terms of the magnitude of the potential fire hazard in which they may become involved. It is not intended to represent the average, maximum, or minimum spill fire size associated with a particular aircraft. See Appendix A for further background information related to TCA.

2.3.2 Practical Critical Fire Area (PCA).

The PCA is two-thirds the size of the TCA for fixed wing aircraft. The PCA and the related quantities of extinguishing agents are based on criteria formulated during the Second Meeting of the International Civil Aviation Organization (ICAO) Rescue and Fire Fighting Panel (RFFP II) in June 1972. RFFP II developed material indicating the practical area is two-thirds of the theoretical area based on the Panel's work, which included a study of extinguishing agents used on actual aircraft fires. In 99 out of 106 studied fires, the quantities of agents used were less than those previously recommended by ICAO. See Appendix A for further background information related to PCA.

Figure 2-1. TCA and PCA for Aircraft



Note: The TCA is a rectangle shape having as one dimension the overall length of the aircraft, and the second dimension determined by the following:

a. For aircraft with an overall length of less than 65 ft (20 m): 40 ft (12 m) plus the width of the fuselage.
b. For aircraft with an overall length of 65 ft (20 m) or more: 100 ft (30 m) plus the width of the fuselage.

2.4 **Control Time.**

The control time is the time required from the arrival of the first fire fighting vehicle and the beginning of agent discharge to reduce the initial intensity of the fire by 90%. It is essential that equipment and techniques control the fire in the PCA in one minute. NFPA 460, *Standard for Aircraft Rescue and Firefighting Services at Airports* (National Fire Protection Association 2024), Annex B, §B.3.

2.5 **Extinguishment Time.**

Extinguishment time is the time required from arrival of the first fire fighting vehicle to the time the fire is completely extinguished. NFPA 460, Annex B, §B.3.

CHAPTER 3. AGENT COMPATIBILITY, SUBSTITUTIONS, AND PERFORMANCE REQUIREMENTS

3.1 Agent Compatibility.

Chemical compatibility is a measure of how stable one substance is when mixed with another substance. Two substances are considered to be incompatible when, if mixed together, they undergo a chemical reaction. As a finished foam solution, there are no adverse effects on fire extinguishment performance when AFFF and multiple F3 products are discharged onto the same fire. AFFF and F3 concentrates are not compatible and should never be mixed together in vehicles or storage tanks.

3.2 Extinguishing Agent Substitutions.

Other extinguishing agent substitutions authorized by the Administrator may be made in amounts that provide an equivalent fire fighting capability. Extinguishing agent substitutes are discussed in §139.317(h). The following are authorized substitutions:

1. 450 lbs of potassium-based dry chemical is an allowable substitution for 500 pounds of sodium-based dry chemical §139.317 (b) (c) (d) (e).
2. F3 qualified under Military Performance Specification (MIL-PRF)-32725, *Fire Extinguishing Agent, Fluorine-Free Foam (F3) Liquid Concentrate, for Land-Based, Fresh Water Applications*, and listed on the Qualified Products Database (QPD) is an allowable substitution for AFFF in equal quantities as identified in §139.317.
3. 460 lbs of Halotron is a qualified clean agent substitution for 500 lbs of Halon 1211, as identified in §139.317.

3.3 Performance Requirements.

AFFF agents are to meet the requirements of MIL-PRF-24385F. This military specification ensures cross-compatibility of the AFFF products regardless of manufacturer.

F3 agents are required to meet the standards set forth in MIL-PRF-32725. F3 fire fighting foam concentrates are not cross-compatible between foam manufacturers.

3.3.1 Actions.

Airport operators are to confirm:

1. The AFFF or F3 meets the standards and it appears on the Qualified Products List (QPL) found on the QPD website.
2. If the AFFF or F3 is not on the QPL, the product does not meet the performance requirements of MIL-PRF-24385F or MIL-PRF-32725.

3.3.2 Quality Product List (QPL) Website.

1. Since the QPL is updated periodically, the FAA recommends airports check and review the QPL for any updates or changes.
2. For qualified AFFF products, refer to the QPD at https://qpldocs.dla.mil/ and search for "AFFF" searching by title.
3. For qualified F3 products, refer to the QPD at https://qpldocs.dla.mil/ and search for "F3" searching by title.

CHAPTER 4. QUALITY CONTROL AND TESTING

4.1 Quality Control.

To meet the regulatory requirements in Part 139, the FAA will accept firefighting foams that have received certification and appear on the Naval Sea Systems Command (NAVSEA) QPL/QPD.

4.2 Testing.

4.2.1 Airports should consider establishing local Standard Operating Guidelines/Standard Operating Procedures (in conjunction with local or state environmental regulatory organizations) to identify a suitable location/storage container to discharge AFFF or F3 for testing to ensure the functionality of the foam proportioning system on each ARFF vehicle.

4.2.2 Airports should establish safe and environmentally effective handling and disposal procedures during testing and re-servicing of each ARFF vehicle with all fire extinguishing agents in accordance with local and state, and federal regulations.

4.2.3 The FAA has allowed airports to use the input based testing system to test the foam proportioning system on their ARFF vehicles.

Note: NFPA 460, *Standard for Aircraft Rescue and Firefighting Services at Airports* (National Fire Protection Association 2024), Chapter 29, addresses foam concentration tolerances for ARFF Vehicles.

4.2.4 Airports should consider using one of the following input based testing systems, accepted by the FAA for immediate use, to satisfy the Part 139 testing requirement while minimizing any possible environmental impact:

1. E-One – Eco-Logic System
2. NoFoam System
3. Oshkosh – Eco Electronic Foam Proportioning (Eco-EFP) System
4. Rosenbauer – FixMix 2.0E Electronic Foam Proportioning System

Note: Input-based tests done by the FAA had a greater correlation to output-based tests at a 3% proportioning rate than at a 6% proportioning rate. Confirmation testing performed by the vendor at delivery/installation that compares input- and output-based tests may help offset this difference by establishing reference values representing the current state of the vehicle. Therefore, the FAA highly recommends airports have the vendor perform this confirmation testing at the time of delivery.

Note: The FAA recommends vehicle system testing occurs within the six-month period before the airport's periodic airport certification safety inspection.

Note: ARFF vehicle foam proportioning systems should be tested in accordance with NFPA 460.

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APPENDIX A. SUPPLEMENTAL INFORMATION

A.1 **Halotron I.**

Subsequent to the U.S. decision to halt production of halon as part of the Montreal Protocol (reference NFPA 460, Annex A, §A.5.2 (2)) and the use of halon-based agents (e.g., Halon 1211) in live fire, training stopped because of its environmental effects.

Halotron I has completed the scale fire test performance evaluations protocols of FAA Technical Report DOT/FAA/AR-95/87, *Full Scale Evaluations of Halon 1211 Replacement Agents for Airport Fire Fighting*, as stated in the Part 139 definition of a clean agent. The FAA teamed with other agencies and industry and identified an acceptable alternative to using halon-based agents in airport rescue fire fighting vehicles. Several potential agents were evaluated. Only the Halotron I product has completed scale fire test performance evaluation and was approved as an alternative fire fighting agent to Halon 1211 for airport fire fighting use. Halotron I has additionally been deemed to be an environmentally acceptable replacement for Halon 1211 by the Environmental Protection Agency (EPA).

Due to the slight differences in specific gravity of Halotron I and Halon 1211, approximately 460 pounds of Halotron I can be placed in the existing vessel (tank) that holds approximately 500 pounds of Halon 1211. Fire performance tests have shown that Halotron I will generally suppress or extinguish fires in the same manner as Halon 1211. In considering the substitution of Halotron I for Halon 1211, the ratio for equivalency in performance is as great as 1.5 to 1 pound by weight.

A.2 **Halon 1211.**

Halon 1211 was previously the primary clean agent used by ARFF departments. Because of its ozone-depleting qualities, the production of Halon 1211 has been banned since January 1, 1994, and the discharge of this agent for training is no longer allowed. Since that time, several environmentally friendly clean agents have been developed and tested. Halon 1211 is still available through reclaiming and recycling sources.

A.3 **Practical Critical Fire Area (PCA).**

For information on PCA, refer to NFPA 460, Annex B, §B.2.1. For information on TCA/PCA, refer to DOT/FAA/AR-11/29, *Methodologies for Calculating Firefighting Agent Quantities Needed to Combat Aircraft Crash Fires.*

A.4 **Theoretical Critical Fire Area (TCA).**

For information on TCA, refer to NFPA 460, Annex B, §B.2.1. See Figure 2-1. For information on TCA/PCA, refer to DOT/FAA/AR-11/29.

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APPENDIX B. REFERENCE MATERIAL

The following documents are applicable to the extent specified in this AC:

1. Code of Federal Regulations (CFR).

14 CFR Part 139	*Certification of Airports*

2. FAA Documents.

AC 150/5210-14	*Aircraft Rescue Fire Fighting Equipment, Tools and Clothing*
AC 150/5210-17	*Programs for Training of Aircraft Rescue and Firefighting Personnel*
AC 150/5220-10	*Guide Specification for Aircraft Rescue and Fire Fighting (ARFF) Vehicles*
DOT/FAA/AR-11/29	*Methodologies for Calculating Firefighting Agent Quantities Needed to Combat Aircraft Crash Fires*
DOT/FAA/AR-95/87	*Full Scale Evaluations of Halon 1211 Replacement Agents for Airport Fire Fighting*

3. Military Specifications.

MIL-PRF-24385	*Fire Extinguishing Agent, Aqueous Film Forming Foam (AFFF) Liquid Concentrate, for Fresh and Seawater*
MIL-PRF-32725	*Fire Extinguishing Agent, Fluorine-Free Foam (F3) Liquid Concentrate, for Land-Based, Fresh Water Applications*

4. National Fire Protection Association (NFPA).

NFPA 10	*Standard for Portable Fire Extinguishers* (National Fire Protection Association 2022)
NFPA 18	*Standard on Wetting Agents* (National Fire Protection Association 2021)
NFPA 18A	*Standard on Water Additives for Fire Control and Vapor Mitigation* (National Fire Protection Association 2022)
NFPA 440	*Guide for Aircraft Rescue and Firefighting Operations and Airport/Community Emergency Planning* (National Fire Protection Association 2024
NFPA 460	*Standard for Aircraft Rescue and Firefighting Services at Airports* (National Fire Protection Association 2024).

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APPENDIX C. DEFINITIONS AND ACRONYMS

C.1 **Definitions.**

1. **Aqueous Film-Forming Foam Concentrate (AFFF).** A concentrate based on fluorinated surfactants plus foam stabilizers to produce a foam which, when drained, creates a fluid aqueous film for suppressing hydrocarbon fuel vapors. Concentrate is usually diluted with water to a 1%, 3%, or 6% solution.
2. **Class A Fire.** A fire of ordinary combustible materials, such as wood, cloth, paper, rubber, and many plastics.
3. **Class B Fire.** A fire of flammable liquids, combustible liquids, petroleum greases, tars, oils, oil-based paints, solvents, lacquers, alcohols, and flammable gases.
4. **Class C Fire.** A fire that involves energized electrical equipment.
5. **Class D Fire.** A fire of combustible metals, such as magnesium, titanium, zirconium, sodium, lithium, and potassium.
6. **Clean Agent.** Clean agent means an electrically nonconducting volatile or gaseous fire extinguishing agent that does not leave a residue upon evaporation and has been shown to provide extinguishing action.
7. **Encapsulator Agent.** A water additive that changes the chemical make-up of a water droplet with the introduction of Spherical Micelles. Usually diluted with water to 0.5%, 1.0%, or 3% solutions.
8. **Fluorine-Free Foam (FFF).** A synthetic foam concentrate based on a mixture of hydrocarbon surface active agents that are fluorine free.
9. **Foam.** An aggregation of small bubbles used to form an air-excluding, vapor-suppressing blanket over the surface of a flammable liquid fuel.
10. **Foam Concentrate.** A concentrated liquid foaming agent as received from the manufacturer.
11. **Hydrocarbon.** A chemical substance consisting of only hydrogen and carbon atoms.
12. **Halogenated Agent.** A hydrocarbon extinguishing agent in which one or more hydrogen atoms are replaced by atoms from the halogen series – fluorine, chlorine, bromine, or iodine.
13. **Practical Critical Fire Area (PCA).** An area approximately two-thirds the size of the Theoretical Critical Fire Area (TCA).
14. **Surface Active Agent (Surfactant).** A chemical agent that materially reduces the surface tension of water.
15. **Synthetic Fluorine-Free Foam (SFFF).** A synthetic foam concentrate containing no fluorochemicals for suppressing hydrocarbon fuel vapors.

16. **Synthetic Foam Concentrate.** Concentrate based on foaming agents other than hydrolyzed proteins and including AFFF concentrates, medium- and high-expansion foam concentrates, and other synthetic foam concentrates.

17. **Theoretical Critical Fire Area (TCA).** The theoretical area adjacent to an aircraft in which fire must be controlled for the purpose of ensuring temporary fuselage integrity and providing an escape area for its occupants.

18. **Wetting Agent.** A concentrate that when added to water reduces the surface tension and increases its ability to penetrate and spread.

C.2 **Acronyms.**

AC	Advisory Circular
AFFF	Aqueous Film Forming Foam
AIP	Airport Improvement Program
ARFF	Aircraft Rescue and Fire Fighting
Br	Bromine
CFR	Code of Federal Regulations
Cl	Chlorine
CO_2	Carbon Dioxide
DoD	Department of Defense
DOT	Department of Transportation
EFP	Electronic Foam Proportioning
EPA	Environmental Protection Agency
F	Fluorine
F3	Fluorine-Free Foam
FAA	Federal Aviation Administration
ICAO	International Civil Aviation Organization
$KC_2N_2H_3O_3$	Urea-based potassium bicarbonate
KCl	Potassium chloride
$KHCO_3$	Potassium bicarbonate
MIL-PRF	Military Performance Specification
$NaHCO_3$	Sodium bicarbonate
NAVSEA	Naval Sea Systems Command
NFPA	National Fire Protection Association
PCA	Practical Critical Fire Area
PFC	Passenger Facility Charge
QPD	Qualified Products Database
QPL	Qualified Products List
RFFP II	Rescue and Fire Fighting Panel
SFFF	Synthetic Fluorine-Free Foam
TCA	Theoretical Critical Fire Area

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-300, 800 Independence Avenue SW, Washington DC 20591 or (2) faxing it to the attention of the Office of Airport Safety and Operations Division at (202) 267-5383.

Subject: AC 150/5210-6E 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: _____

Public Works and Capital Projects Roll Call

District	*Name*	*Yes*	*No*
District 7 - Hyde Park and Pleasant Valley	Truitt*	✓	
District 25 - Amenia, Washington, Pleasant Valley & Millbrook	Houston*		
District 3 - LaGrange	Polasek*		
District 16 - Fishkill and Beacon	Valdés Smith*		
District 9 - City of Poughkeepsie	Atkins*		
District 1 - Town of Poughkeepsie	Gorman		
District 10 - City of Poughkeepsie	Johnson (VC)	absent	
District 12 - East Fishkill	Metzger (C)		
District 13 - East Fishkill and Wappinger	Paoloni		
District 15 - Wappinger	Faust		
District 20 - Red Hook, Tivoli, and Rhinebeck	Munn		
District 23 - Pawling, Beekman and East Fishkill	Rolison		

Present: 11 Resolution: ✓ Total : 11 0

Absent: 1 Motion: ___ Yes No

Vacant: 0 Abstentions: 0

2025037 AMENDING THE 2025 ADOPTED COUNTY BUDGET TO FUND THE REMOVAL AND DISPOSAL OF PFAS CONTAINED FIREFIGHTING FOAM AND TO PURCHASE A NEW SUPPLY OF NON-PFAS CONTAINED FOAM AS IT PERTAINS TO THE HUDSON VALLEY REGIONAL AIRPORT

MARCH 6, 2025

Roll Call Sheets

District	Last Name	YES	NO
District 7 - Hyde Park and Pleasant Valley	Truitt	✓	
District 25 - Amenia, Washington, Pleasant Valley & Millbrook	Houston	absent	
District 3 - LaGrange	Polasek		
District 16 - Fishkill and Beacon	Valdés Smith		
District 9 - City of Poughkeepsie	Atkins		
District 1 - Town of Poughkeepsie	Gorman		
District 2 - LaGrange, Pleasant Valley & Town of Poughkeepsie	Travelpiece		
District 4 - Hyde Park and Town of Poughkeepsie	Lawler		
District 5 - Town of Poughkeepsie	D'Aquanni		
District 6 - Town of Poughkeepsie	Kaul		
District 8 - City and Town of Poughkeepsie	Brendli		
District 10 - City of Poughkeepsie	Johnson		
District 11 - Clinton, Pleasant Valley, and Rhinebeck	Kearney		
District 12 - East Fishkill	Metzger		
District 13 - East Fishkill and Wappinger	Paoloni	absent	
District 14 - Wappinger and Town of Poughkeepsie	Versaci		
District 15 - Wappinger	Faust		
District 17 - Town and Village of Fishkill	McHoul		
District 18 - City of Beacon and Fishkill	Page		
District 19 - North East, Stanford, Pine Plains, Milan & Red Hook	Drago		
District 20 - Red Hook, Tivoli, and Rhinebeck	Munn		
District 21 - East Fishkill	Caswell		
District 22 - Beekman and Union Vale	Garito		
District 23 - Pawling, Beekman and East Fishkill	Rolison		
District 24 - Dover and Pawling	House		

Present:	23	**Resolution:**	✓	**Total :**	23	0
Absent:	2	**Motion:**			Yes	No
Vacant:	0			**Abstentions:**	2	

2025037 AMENDING THE 2025 ADOPTED COUNTY BUDGET TO FUND THE REMOVAL AND DISPOSAL OF PFAS CONTAINED FIREFIGHTING FOAM AND TO PURCHASE A NEW SUPPLY OF NON-PFAS CONTAINED FOAM AS IT PERTAINS TO THE HUDSON VALLEY REGIONAL AIRPORT

MARCH 10, 2025