U.S. Department
of Transportation
Federal Aviation
Administration

Advisory Circular

Subject: Aircraft Fire Extinguishing Agents | **Date:** Draft | **AC No:** 150/5210-6E
Initiated By: AAS-300 | **Change:**

1 Purpose.

This Advisory Circular (AC) provides guidance and specification 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 standards and guidelines in this AC to establish uniform application for aircraft fire extinguishing agents. This AC does not constitute a regulation, is not mandatory, and is not legally binding in its own right. It will not be relied upon as a separate basis by the FAA for affirmative enforcement action or other administrative penalty. Conformity with this AC is voluntary, and nonconformity will not affect rights and obligations under existing statutes and regulations, except for the projects described in subparagraphs 2, 3, and 4 below:

1. The standards and guidelines contained in this AC are practices the FAA recommends for establishing an acceptable level of safety and performance for Aircraft Rescue and Fire Fighting (ARFF) operations.
2. This AC provides one, but not the only, acceptable means of meeting the requirements of 14 Code of Federal Regulations (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 extinguishing agent 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 Principal Changes.

The AC incorporates the following principal changes:

1. Added allowable substitutions for extinguishing agents in paragraph 3.2.
2. Added new Appendix A, Supplemental Information.
3. Moved related documents to new Appendix B, Reference Material.
4. Moved definitions to new Appendix C, Definitions and Acronyms, and added new definitions.
5. Added new Figure 2-1, TCA and PCA for Aircraft.
6. 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. When navigating within this document, return to the previously viewed page by pressing the "ALT" and " ←" (left arrow) keys simultaneously.

The figure in this document is schematic representations and 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

CONTENTS

CONTENTS

Page

FIGURES

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
   - Foam
2. Complementary agents
   - Clean agents
   - Dry chemical agents
   - Other agents

Each fire extinguishing agent has advantages, limitations, equipment requirements, and unique application techniques. Agents include water, foam, dry chemical, clean agents, combustible metal, and wetting agents.

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 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 fuel. The solution drainage from some foams (AFFF) forms an aqueous film on most aviation fuels. 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 to renew the foam blanket from time to time.

1.2.1 Aqueous Film Forming Foam (AFFF).

The foam formed 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, respectively, to create a foam solution upon discharge.

1.2.2 Synthetic Fluorine Free Foam (SFFF)/Fluorine-Free Foam (F3).

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

F3 is a foam concentrate based on a mixture of hydrocarbon surface active agents that are fluorine free. These foams are free of persistent intentionally added fluorosurfactants that can harm groundwater.

Safety Notice No. 1

Fluorine-Free Foam (F3)

DO NOT MIX F3 foam from different vendors because they are NOT COMPATIBLE.

1.3 Complementary Agents.

A complementary agent is an extinguishing agent that has the compatibility to perform fire-suppression functions 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 or gaseous fire extinguishing agent that does not leave a residue upon evaporation and has been shown to provide extinguishing action.

1.3.1.1 Carbon Dioxide.

Carbon dioxide (CO_2) is colorless, non-flammable, and odorless. It displaces air, smothering the fire. Tests show that low-pressure CO_2 is more effective in ARFF operations than high pressure CO_2. The tests further indicate that CO_2 can be given parity with dry chemical powder on the basis of 4.4 pounds of CO_2 gas per 2.2 pounds of dry chemical.

Safety Notice No. 2

Carbon Dioxide

In high concentrations, CO_2 can cause unconsciousness and death.

1.3.1.2 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 — 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. The three halogen elements commonly found in extinguishing agents are fluorine (F), chlorine (Cl), and bromine (Br).

1.3.1.2.1 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.

1.3.1.2.2 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. Halotron I has completed the scale fire test performance evaluations protocols of FAA Technical Report DOT/FAA/AR-95/87, as stated in the Part 139 definition of a clean agent. Refer to Appendix A for additional information on Halotron I.

1.3.1.2.3 Halogenated Agents.

Halogenated agents leave no agent residue and are the preferred agent for aircraft tire fires, engine fires, interior aircraft fires, electrical component fires, and flight line vehicle or equipment engine fires.

Safety Notice No. 3

Halogenated Agents

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

1.3.2 Dry Chemical Agents.

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.

1.3.3 Other Agents.

1.3.3.1 **Combustible Metal Agents.**

Agents used to combat Class D fires, such as magnesium fires, are referred to as combustible metal agents. Agents with the consistency of dry powders are used exclusively on combustible metals. Heat from the fire causes the powder to form an air-excluding crust. Powders do not cling well to vertical surfaces. For additional information, refer to the two agents currently approved for use which are Metal-X as a dry powder agent and FEM-12 as a liquid agent.

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 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.

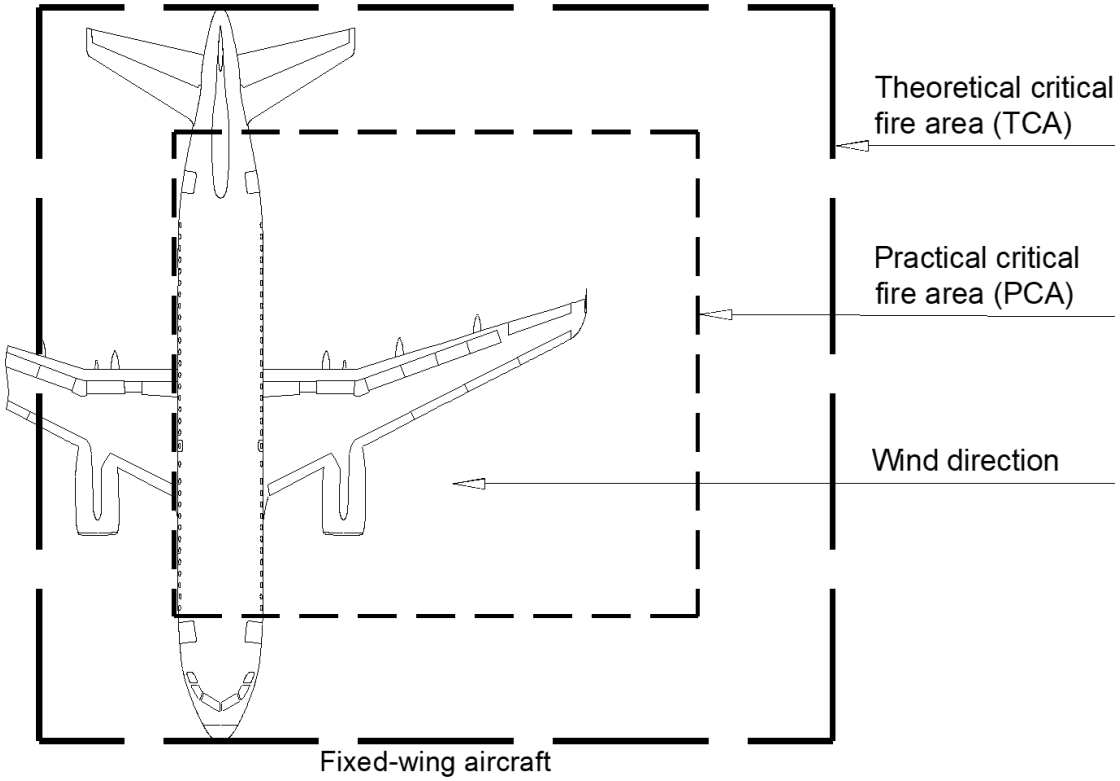
2.3.1 Theoretical Critical Fire Area (TCA).

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 percent. It is essential that equipment and techniques control the fire in the PCA in one minute. National Fire Protection Association (NFPA) 460, 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 mixed together and undergo a chemical reaction. Foam and complementary agents need to be compatible in their use as extinguishing agents. The compatibility of agents is discussed in NFPA 460, Chapter 5, §5.4. F3 does not have compatibility between foam manufacturers.

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 approved 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 an authorized 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 foams are not cross-compatible between foam manufacturers.

3.3.1 Actions.

Airport operators are to confirm:

1. The AFFF or F3 meets the standards if 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 is not authorized for use at Part 139 airports.

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 http://qpldocs.dla.mil/search/parts.aspx?qpl=1910&param=QPL-24385&type=256.
3. For qualified F3 products, refer to the QPD at https://qpldocs.dla.mil/search/parts.aspx?qpl=4513&param=MIL-PRF-32725&type=26144.

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 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 base testing system to test the foam proportioning system on their ARFF vehicles.

Note: NFPA 412 addresses Standards for Evaluating Aircraft Rescue and Fire-fighting Foam Equipment; paragraph 5 addresses foam concentration tolerances for ARFF Vehicles.

4.2.4 Consider using one of the following input base 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 – FixMix2 Automatic Foam Premixing System

Note: Input-based tests done by the FAA had a greater correlation to output-based tests at a 3-percent proportioning rate than at a 6-percent 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, *Standard for Aircraft Rescue and Firefighting Services at Airports*, 2024

Edition. The FAA recommends this test be accomplished within the six-month period prior to their periodic certification safety inspection.

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.

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 468 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, *Standard for Aircraft Rescue and Firefighting Services at Airports*, Annex B, §B.3.1. 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, *Standard for Aircraft Rescue and Firefighting Services at Airports*, Annex B, §B.2.1. See Figure 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*.

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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–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 18	*Standard on Wetting Agents*
NFPA 418	*Standard for Heliports*
NFPA 440	*Guide for Aircraft Rescue and Firefighting Operations and Airport/Community Emergency Planning*
NFPA 460	*Standard for Aircraft Rescue and Firefighting Services at Airports*

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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 and usually diluted with water to a 1 percent, 3 percent, or 6 percent 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. **Foam.** An aggregation of small bubbles used to form an air-excluding, vapor-suppressing blanket over the surface of a flammable liquid fuel.
8. **Foam Concentrate.** A concentrated liquid foaming agent as received from the manufacturer.
9. **Hydrocarbon.** A chemical substance consisting of only hydrogen and carbon atoms.
10. **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.
11. **Practical Critical Fire Area (PCA).** An area approximately two-thirds the size of the Theoretical Critical Fire Area (TCA).
12. **Surface Active Agent (Surfactant).** A chemical agent that materially reduces the surface tension of water.
13. **Synthetic Fluorine-Free Foam (SFFF).** A synthetic foam concentrate containing no fluorochemicals for suppressing hydrocarbon fuel vapors.
14. **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.
15. **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.

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:

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

_____
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☐ Other comments:

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

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Submitted by: _____ Date: _____