National Air Transportation Association

The Voice of Aviation Business

The Future of Hangar Fire Protection

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10:55-11:35 am

Panel

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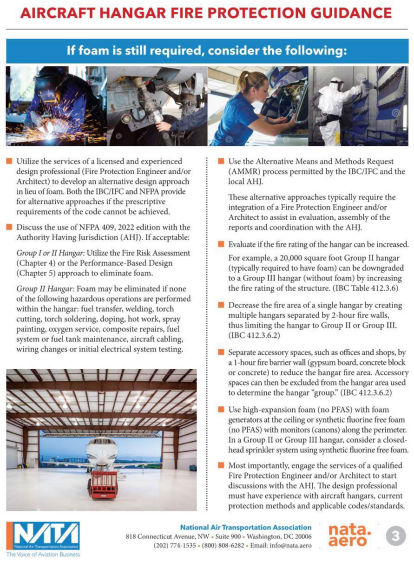
NATA TOOLKIT | Aircraft Hangar Fire Protection Guidance

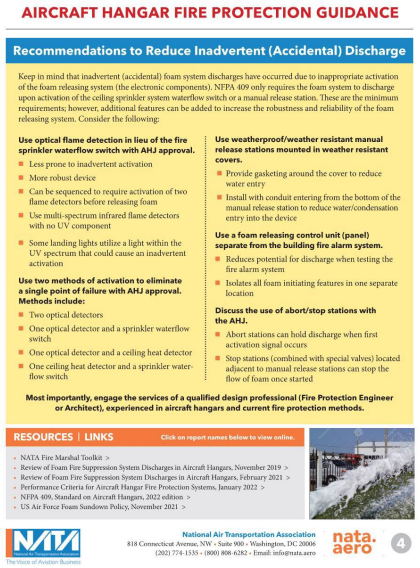
Applicable Codes and Hangar Classification

Code Exceptions How to Avoid Foam

If Foam is Required Other Considerations



Foam System Recommendations



Most Frequently Asked Questions

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Applicable Codes

- 2021 IBC and IFC
  - 2016 NFPA 409 is adopted via Reference
  - Section 412 “Aircraft Related Occupancies”
  - 2024 I-Codes will adopt 2022 NFPA 409

    Codes will typically be adopted by Authority Having Jurisdiction (AHJ) in 2025
- NFPA 409: *Standard on Aircraft Hangars*
  - Fire Suppression Standards
  - Referenced Standard to IBC and IFC
  - Which Code Takes Precedence?
- Always Verify Code Requirements with AHJ
  - Local Amendments
  - Varying Adoption Dates

Hangar Classification

- Hangar Group I – Foam Typically Required
  - Door over 28’ or Hangar Bay over 40,000 SF
- Hangar Group II – Foam May Not be Required
  - Door 28’ or less and Hangar Bay 12,000-40,000 SF
- Hangar Group III – Foam May Not be Required
  - Door 28’ or less and Hangar Bay less than 12,000 (may be up to 30,000 SF with Building Fire Rating)

[F] TABLE 412.3.6 HANGAR FIRE SUPPRESSION REQUIREMENTS[a, b, c]

MAXIMUM SINGLE FIRE AREA (square feet)	TYPE OF CONSTRUCTION								
	IA	IB	IIA	IIB	IIIA	IIIB	IV	VA	VB
≥ 40,001	Group I	Group I	Group I	Group I	Group I	Group I	Group I	Group I	Group I
40,000	Group II	Group II	Group II	Group II	Group II	Group II	Group II	Group II	Group II
30,000	Group III	Group II	Group II	Group II	Group II	Group II	Group II	Group II	Group II
20,000	Group III	Group III	Group II	Group II	Group II	Group II	Group II	Group II	Group II
15,000	Group III	Group III	Group III	Group II	Group III	Group II	Group III	Group II	Group II
12,000	Group III	Group III	Group III	Group III	Group III	Group III	Group III	Group II	Group II
8,000	Group III	Group III	Group III	Group III	Group III	Group III	Group III	Group III	Group II
5,000	Group III	Group III	Group III	Group III	Group III	Group III	Group III	Group III	Group III

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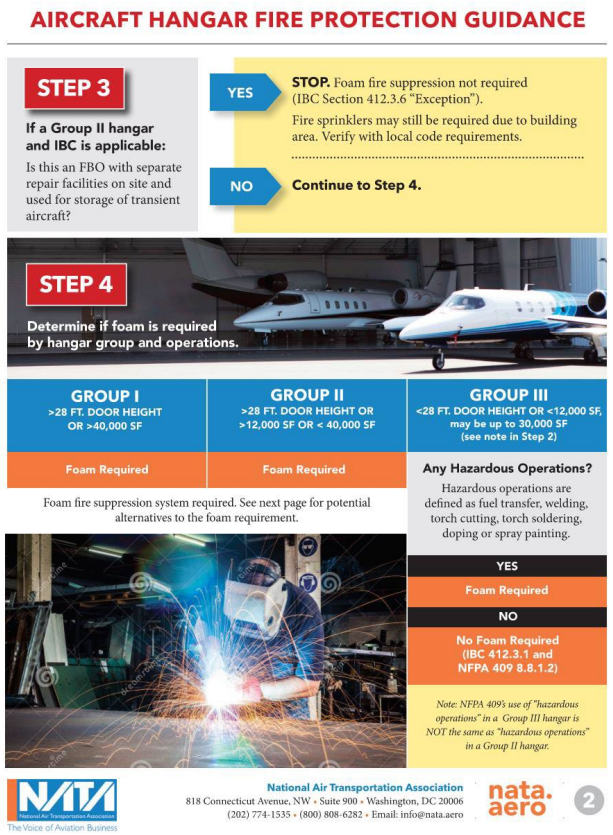
Typical Code Exceptions



- Group I Hangar
  - Limited Exceptions to Foam Requirement
- Group II Hangar
  - 2022 NFPA 409: Operations-Based Exception
  - 2021 IBC: Exception if FBO + Separate Repair Facilities + Transient
- Group III Hangar
  - Typically, No Foam Requirement unless for Hazardous Operations
    - Hazardous Operations = Fuel Transfer, Welding, Torch Cutting + Soldering, Doping or Spray Painting, Fuel Limitations = Fire Suppression per Group II (Foam)

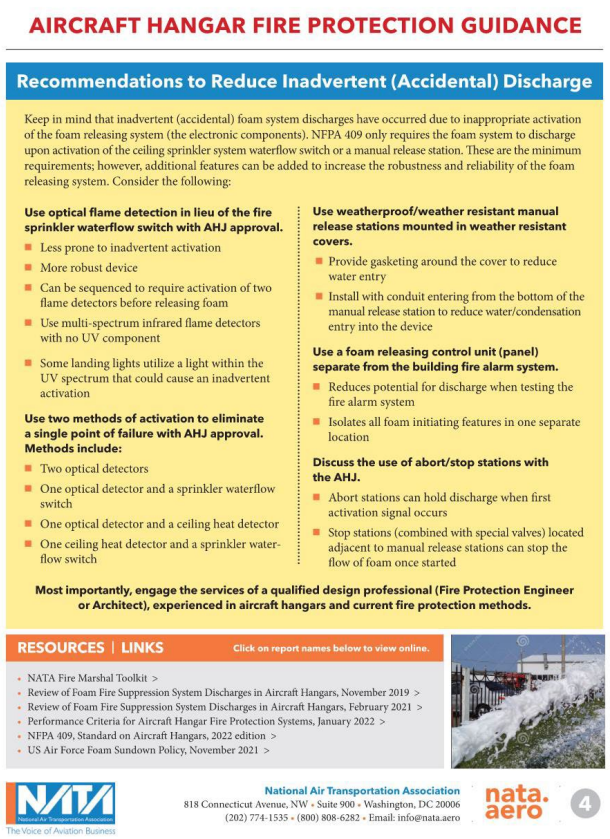
If Foam is Required: Building Considerations

- Hangar Separations: Fire Walls and Setback
- Increase Building Fire Rating
- Separate Accessory Spaces with Fire Barriers

Alternate Code Approaches:

- Alternate Materials and Methods Request (AMMR)
  - IBC allows for Alternate Materials and Methods Approach
  - Prepared by Fire Protection Engineer or Design Professional
- Risk-Based Approach | 2022 NFPA 409
  - Fire Risk Assessment or Performance-Based Design

Foam System Recommendations



AIRCRAFT HANGAR FIRE PROTECTION GUIDANCE

Recommendations to Reduce Inadvertent (Accidental) Discharge

Keep in mind that inadvertent (accidental) foam system discharges have occurred due to inappropriate activation of the foam releasing system (the electronic components). NFPA 409 only requires the foam system to discharge upon activation of the ceiling sprinkler system waterflow switch or a manual release station. These are the minimum requirements; however, additional features can be added to increase the robustness and reliability of the foam releasing system. Consider the following:

Use optical flame detection in lieu of the fire sprinkler waterflow switch with AHJ approval.

- Less prone to inadvertent activation
- More robust device
- Can be sequenced to require activation of two flame detectors before releasing foam
- Use multi-spectrum infrared flame detectors with no UV component
- Some landing lights utilize a light within the UV spectrum that could cause an inadvertent activation

Use two methods of activation to eliminate a single point of failure with AHJ approval. Methods include:

- Two optical detectors
- One optical detector and a sprinkler waterflow switch
- One optical detector and a ceiling heat detector
- One ceiling heat detector and a sprinkler waterflow switch

Use weatherproof/weather resistant manual release stations mounted in weather resistant covers.

- Provide gasketing around the cover to reduce water entry
- Install with conduit entering from the bottom of the manual release station to reduce water/condensation entry into the device

Use a foam releasing control unit (panel) separate from the building fire alarm system.

- Reduces potential for discharge when testing the fire alarm system
- Isolates all foam initiating features in one separate location

Discuss the use of abort/stop stations with the AHJ.

- Abort stations can hold discharge when first activation signal occurs
- Stop stations (combined with special valves) located adjacent to manual release stations can stop the flow of foam once started

Most importantly, engage the services of a qualified design professional (Fire Protection Engineer or Architect), experienced in aircraft hangars and current fire protection methods.

RESOURCES | LINKS — Click on report names below to view online.

- NATA Fire Marshal Toolkit >
- Review of Foam Fire Suppression System Discharges in Aircraft Hangars, November 2019 >
- Review of Foam Fire Suppression System Discharges in Aircraft Hangars, February 2021 >
- Performance Criteria for Aircraft Hangar Fire Protection Systems, January 2022 >
- NFPA 409, Standard on Aircraft Hangars, 2022 edition >
- US Air Force Foam Sundown Policy, November 2021 >

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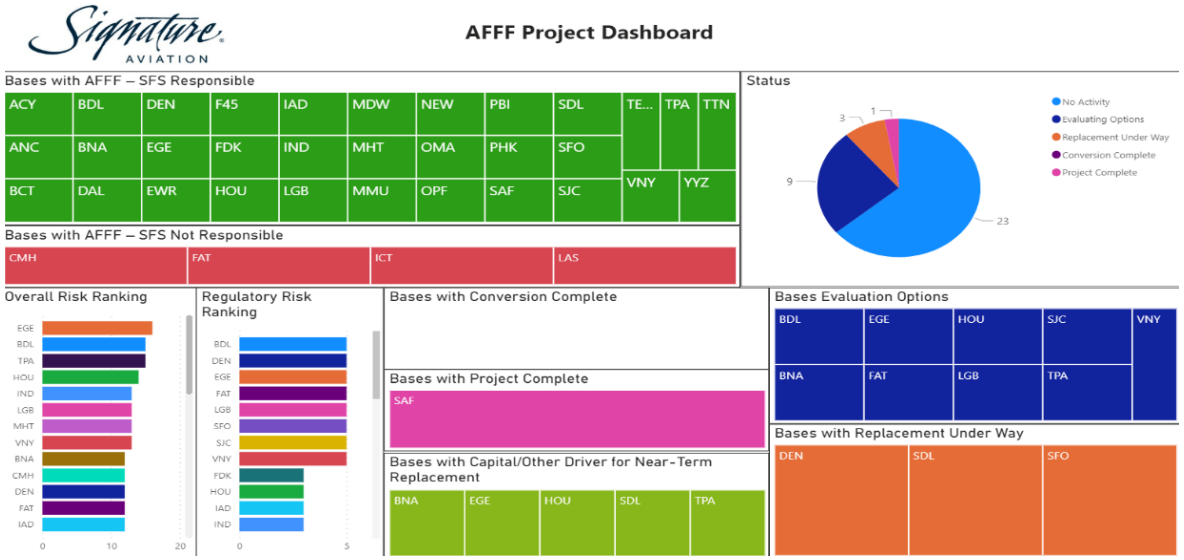
- Use High Expansion Foam (no PFAS)
- Group II: Consider Closed-Head Sprinkler System with Synthetic Fluorine-Free Foam
- Use Optical Flame Detection in Lieu of Fire Sprinkler Waterflow Switch
- Use Two Methods of Activation to Eliminate a Single Point of Failure
- Use Weatherproof/Weather-Resistant Manual Release Stations
- Use a Foam Releasing Control Unit Separate from Building Fire Alarm System
- Discuss the use of Abort/Stop Stations with AHJ

Foam System Removal Assessment Process



Site Prioritization and Risk Assessment

Identification of Conversion Options and Request Conversion Approvals

Strategic Base Specific Implementation Plan

Environmental Considerations – Disposal

EPA's Interim Guidance on the Destruction and Disposal of PFAS (December 18, 2020)
Uncertainties are linked with all technologies and the ability to control migration of PFAS to the environment.

Thermal Treatment

Landfill

Class I Deep Well Injection

Interim Storage

- USEPA is required to issue final disposal guidance by late 2023
- Pressure to ensure that disposal is not accepted at traditional hazardous waste landfills and hazardous waste incinerators
  - PFAS specific tailored solutions
- Only way to deal with PFAS is to turn off the tap

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Questions: