

Item 5. Email from Maine State Fire Marshall Office

From: Day, Gregory J <Gregory.J.Day@maine.gov>
Sent: Tuesday, September 24, 2024 4:45 PM
To: Kristine Logan <KristineL@mrra.us>; Loyzim, Melanie <Melanie.Loyzim@maine.gov>; Veilleux, Marc <Marc.Veilleux@maine.gov>
Cc: jnall <jnall@flightlevelaviation.com>; Eric Perkins <ericp@mrra.us>
Subject: RE: Brunswick Executive Airport

Kristine, thank for reaching out. The following is the code requirements from NFPA 409 Standard on Aircraft Hangars (2011 Edition)

- Hangar 4, door height is 42' in height and square footage of the hanger deck is 41,000 single bay.
- Hangar 5 , door height is 43' in height and square footage of the hanger deck is 43000, hangar 5 has two hangar decks that are this size and one that is 14000 sq feet.
- Hangar 6 , door height is 48' in height and square footage of hanger deck is 51000 with 2 separate hangar decks in the building that are the same size.
- All three of the above hangers are Classified as Class 1

Chapter 6 Protection of Group I Aircraft Hangars

6.1 General. 6.1.1

The protection of aircraft storage and servicing areas for Group I aircraft hangars shall be in accordance with any one of the following:

- (1) A foam-water deluge system, as specified in 6.2.2. (6.2.2 is Deluge Foam-Water Sprinkler System Design and Performance) In addition, supplementary protection systems as specified in 6.2.3 shall be provided in hangars housing single aircraft having wing areas greater than 279 m² (3000 ft²).
- (2) A combination of automatic sprinkler protection in accordance with 6.2.4 (6.2.4 is Closed-Head Water Sprinkler Systems for Aircraft Storage and Servicing Areas)and an automatic low-level low-expansion foam system in accordance with 6.2.5.
- (3) A combination of automatic sprinkler protection in accordance with 6.2.4 and an automatic low-level high-expansion foam system in accordance with 6.2.5. (6.2.5.5 is Low-Level High-Expansion Foam Systems)

6.1.2 Group I aircraft hangar storage and service areas housing unfueled aircraft shall be provided with protection in accordance with 6.1.1 or with automatic sprinkler protection as specified in Chapter 12. Chapter 12 states Sprinkler systems shall be either wet pipe or single interlock preaction, designed and installed in accordance with the applicable sections of NFPA13 and the provisions of this chapter.

The applicable codes and standards are very prescriptive, and they thoroughly govern the design, construction and performance of aircraft hangar fire suppression systems. Among these are the International Building Code (IBC), International Fire Code (IFC), National Fire Protection Association (NFPA) 409, NFPA 11, State/Local requirements, and any Owner adopted standards

such as Factory Mutual (FM) Global (including FMG Data Sheet 7-93) or Unified Facilities Criteria (UFC) 4-211-01 for the Department of Defense. These documents cover all types of aircraft hangars categorized by their use — such as storage and light maintenance, heavy maintenance, manufacturing, fuel cell, wash bays, corrosion control and paint hangars. Each aircraft hangar function comes with unique, varying risks unique to the type of maintenance, presence of aviation fuel or other chemicals and size of hangars. NFPA 409 also allows other equivalent fire suppression systems, as long as sufficient technical documentation is submitted to the authorities, and the alternative system is approved.

Most commercial and Department of Defense hangars for larger aircraft fall into the NFPA 409 Group I category, meaning the hangar doors are over 28 feet tall or a single fire area is more than 40,000 square feet.

NFPA 11, Standard for Low, Medium and High Expansion Foam, identifies several types of foam concentrates which may be used to extinguish hydrocarbon fuels. Of these foams, AFFF and HEF have been the most commonly used in aircraft hangars. NFPA 409 identifies several options for Group I aircraft hangar fire suppression, summarized below:

- Option 1 is a Foam-Water Deluge System. This system utilizes low expansion foam (max 20:1) discharged uniformly from open sprinklers in the hangar overhead. For hangars housing wide body aircraft, the wings block the application of foam directly below and a supplementary protection system using oscillating (or fixed) monitor-nozzles discharging low expansion foam must be provided. Foam can either be AFFF (aqueous film forming foam) or a fluorine-free synthetic foam, which is becoming more common as the foam concentrates become listed with proportioning and discharge devices.
- Option 2 is a combination of water-only overhead sprinklers and an automatic low-level low expansion foam (expansion ratio up to 20:1) system. This system uses water-only from a wet pipe or preaction sprinkler system plus full-floor coverage oscillating monitor nozzles or grate nozzles located in floor trenches. Foam-water solution creates a film over the flaming pool fire, while the fuel and foam-water solution flows by gravity into drainage trenches. Typically, this is also an AFFF system.
- Option 3 is a combination of water-only overhead sprinklers and an automatic low-level high expansion foam (HEF) system, with a maximum expansion ratio of 1000:1. This system uses water-only from an overhead wet pipe or preaction sprinkler system plus full-floor coverage from high expansion foam generators covering the entire hangar floor discharging at a rate of 3 cfm/sf. HEF builds up on the hangar floor to a depth of at least three feet, and often, much deeper than that.

Having provided you the Code requirements and some options, any changes to these suppression systems will have to come to our office for the sprinkler division for permitting and review.

I hope this helps. Any questions please let me know

Best.

Greg

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From: Kristine Logan <KristineL@mrra.us>
Sent: Tuesday, September 17, 2024 3:27 PM
To: Loyzim, Melanie <Melanie.Loyzim@maine.gov>
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Subject: RE: Brunswick Executive Airport

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Thank you, Melanie. Much appreciated.

Hello Greg, it is nice to be connected. As you may be aware, on Aug 19th we had an accidental release of the AFFF foam system in one of our hangars. We are working to find a few options for fire suppression in three of our hangars. Hangar 4, which just had the release, is used by our tenant to store 2-3 Dash 8 aircraft. Every month or so, they pull the planes out, fire them up, and test the systems. Then turn them off and tow them back into the hangar where they are stored. There are rarely any people in the hangar as they do not work on the planes in the hangar.

In that hangar, we also have a high-pressure water suppression system that delivers water at 170 PSI and 8000 gal/min. What I am looking for is, in this hangar only, with the limited operations (just storage) would the water only system be acceptable for fire suppression under these conditions? If I need to provide documentation, please let me know what they would be.

My second question is, moving forward, we are getting quotes to have the AFFF systems removed and a new foam system, for each of the three hangars – including

hangar 4, installed that would have the 3F foam. Our hangars are Group 1 hangars, and I am looking for verification that 3F foam is an acceptable/eligible foam for fire suppression systems in those hangars.

I am happy to get on a phone call to discuss any of this in more detail. I am interested in learning as much as possible about options for fire suppression that does not include AFFF so any suggestions, ideas, or resources that you can share are appreciated.

Thank you,
Kristine

Kristine Logan (She/Hers)

Executive Director

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