
NFPA 418, Standard for Heliports

- **Vertiport Task Group Report**

TASK GROUP RECOMMENDATIONS

Recommendation Indicators

- This **color** denotes a recommended addition
- This ~~**color**~~ denotes a recommended redaction
- This highlight color denotes the justification for a recommendation
- This highlight color denotes additional discussion comments provided

Title

NFPA 418 Standard for Heliports **and Vertiports**

Justification: Expands the scope of 418 to include vertiports

Chapter 1 Administration

1.1.1 This standard specifies the minimum requirements for fire protection for heliports, **helistops**, vertiports, vertistops, and rooftop hangars.

1.2 Purpose. The purpose of this standard is to establish minimum fire safety requirements for operation at heliports, **helistops, vertiports, and vertistops,** for the protection of persons, aircraft, and other property. (See Annex B, Heliport Emergency Planning and Training for Safety Personnel.)

Justification: Brings the term "helistop" into NFPA 418, which is already defined by other NFPA standards, and is a term that is referenced by the FAA, IFC and IBC. While a helistop is a form of heliport, there are specific differences that while do not apply at the federal level do apply at the municipality level which an AHJ needs to take into consideration.

Chapter 2 Referenced Publications

Add the following referenced publications:

2.2, NFPA Publications

- **NFPA 2, Hydrogen Technologies Code, 2020 edition.**
- **NFPA 70E, Standard for Electrical Safety in the Workplace, 2021 edition.**
- **NFPA 410, Standard on Aircraft Maintenance, 2020 edition.**
- **NFPA 855, Standard for the Installation of Stationary Energy Storage Systems, 2020 edition.**

2.3, Other Publications.

- **FAA Advisory Circular AC ~~150/5390-2C~~ 150/5390-2D, Heliport Design**

NOTE: 2D will be the next revision of the FAA design advisory circular which will replace the current 2C. Estimated release date is Dec 2021.

- **FAA Advisory Circular AC 150/5390-3(X)*, Vertiport Design**

**NOTE: Currently the FAA vertiport standard has not been published, therefore this version is represented with an "X" with the understanding it will need to be changed to reflect the correct standard iteration. If this document has not been published before the NFPA-418 standard is ready for submission, this reference will need to be removed from the NFPA-418 document. .*

2.4, References for Extracts in Mandatory Sections.

- **NFPA 5000, Building Construction and Safety Code, 2021 edition.**

Justification: Provides reference to the definition of the term "Helistop".

Chapter 3 Definitions

Add the following definition:

3.3.5.2 Helistop. A heliport where no refueling, maintenance, repair, or storage of helicopters is permitted. (NFPA 5000, 2021)

Justification: Brings the term "helistop" into NFPA 418 which is defined by other NFPA standards and a term that is referenced by the FAA. There are significant differences between a heliport and a helistop as to the standards they may apply.

3.3.6.1 Controlling Dimension. The greatest distance between two outermost points on an aircraft that are opposite one another, e.g., wingtip to wingtip, rotor tip to rotor tip, rotor tip to wingtip, etc… with any adjustable or articulated components at their maximum outboard deflection.

Justification: Provides for a dimensional standards that can be used in determining fire safety requirements based on aircraft size. This criteria is referenced in ASTM International Vertiport Standards Draft.

Discussion: Is there a place where Controlling Dimension could replace Overall Length?

Define Heliport/Vertiport Category Classification in the definitions section.

3.3.X. Heliport/Vertiport Category. The heliport/vertiport category is based on the overall length and width, whichever is greater, of the largest design aircraft which is intended to use the facility and designated as either H-1, H-2, or H-3. *(See Annex C for additional guidance.)*

**Note: Should NFPA define the term "Design Aircraft". FAA AC 150/5390-2C uses the term "Design Helicopter" and defines it in the following way: A single or composite helicopter that reflects the maximum weight, maximum contact load/minimum contact area, overall length (D), rotor diameter (RD), tail rotor arc radius, undercarriage dimensions, and pilot's eye height of all helicopters expected to operate at the heliport.*

3.3.X.1 H-1. A classification where both the aircraft's overall length and width are less than 50 ft (15.2m).

3.3.X.2 H-2. A classification where the aircraft's overall length or width is between 50 ft (15.2m), or up to, but not including 80 ft (24.4m).

3.3.X.3 H-3. A classification where the aircraft's overall length or width is between 80 ft (24.4m), or up to, but not including 120 ft (36.6m).

Justification: The Heliport category H1, H2, and H3 are used in Table 5.7.3.1, Table 9.2, Table C.1(a) and Table C.1(b)

Chapter 4 General Requirements – Land Based Facilities

4.1.1 Listing. This chapter shall provide requirements for the correct use of heliport, **helistop, vertiport, and vertistop** firefighting system components.

4.2.1 The design drawings for the construction and protection of ~~the~~ a heliport, **helistop, vertiport or vertistop** shall be approved by the authority having jurisdiction.

4.2.2 The design of the heliport **or helistop**, including all the aeronautical components, shall be in accordance with FAA AC 150/5390-2(**D**), Heliport Design Advisory Circular.

4.2.3 The design of the vertiport or vertistop, including all the aeronautical components, shall be in accordance with the FAA AC 150/5390-3(X), Vertiport Design Advisory Circular.

4.7 Fueling systems. Fueling systems shall be designed in accordance with NFPA 407 **or approved as alternative energy sources as permitted in 4.7.1.1 or 4.7.1.2.**

4.7.1 Fueling equipment shall not hinder or obstruct access to exits or firefighting equipment.

4.7.1.1 Energy storage systems, including the storage of lithium-ion batteries, shall be designed, and installed, in accordance with NFPA 855.

4.7.1.2 Hydrogen storage and fueling facilities shall be designed and installed in accordance with NFPA 2.

Justification: Direct reference to current NFPA standards 855 and 2.

4.8 Power Transfer and Charging Systems. (Move Means of Egress to 4.10)

4.8.1 Power transfer and charging systems shall be installed in accordance with NFPA 70.

4.8.2 Power transfer and charging systems shall be designed to not penetrate the FATO and safety area obstruction clearance requirements in

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FAA AC 150/5390-2D, Heliport Design Advisory Circular and FAA AC 150/5390-3(X), Vertiport Design Advisory Circular.

4.9 Electrical Hazard Protection

4.9.1 Where electric and hybrid electric aircraft are to be operated, landing area surfaces shall be designed to prevent electric shock hazards to ground personnel and passengers. (See Annex E for guidance)

4.9.2 All power transfer and charging systems shall have all of the following:

(1) an emergency shut-off button that will de-energize electrical power to the system

(2) be located within 25 feet of the edge of a FATO or parking area respectively.

(3) be fully accessible and clearly marked.

~~4.8~~ change to **4.10** Means of Egress

Chapter 5 Rooftop Landing Facilities

5.4.3 Rooftop landing area surfaces shall be designed to prevent electric shock hazards to ground personnel and passengers in accordance with NFPA 70E.

5.7 Fire Protection

5.7.1 **At sites where aircraft containing liquid carbon-based fuels are intended to operate,** a foam fire-extinguishing system with either a fixed discharge outlet(s) in accordance with 5.7.2 or a hose line(s) in accordance with 5.7.3 shall be designed and installed to protect the rooftop landing pad, unless otherwise permitted by one of the following:

(1) A foam fire-extinguishing system shall not be required for ~~heliports~~ **a site** located on open parking structures or buildings that are not normally occupied.

(2) **A specific site-based fire risk assessment, in accordance with Chapter 4 of NFPA 409**

(3) **A performance-based design approach, in accordance with Chapter 5 of NFPA 409**

5.7.1.1 At sites utilizing energy sources other than liquid carbon-based fuels, fire protection shall be provided in accordance with this standard for vertiports or vertistops, and by one of the following: (vertiports or vertistops could be removed here)

(1)**a specific site-based fire risk assessment, in accordance with chapter 4 of NFPA 409**

(2) **a performance-based design approach, in accordance with chapter 5 NFPA 409**

(Recommend potentially referencing NFPA 409 for clarity of foam under use of risk-based approach)

5.7.1.5 ~~The~~ Foam **and fire protection system** components shall be installed in an area of the heliport and shall not penetrate the approach takeoff surface, transitional surfaces, and safety area as defined in FAA AC 150/5390-2D, Heliport Design Advisory Circular.

5.7.2.1 **Where fixed foam fire-extinguishing systems are required, the** ~~Fixed foam re-extinguishing~~ systems shall be designed and installed in accordance with NFPA 11, or an equivalent standard, as appropriate, except as modified by this chapter.

5.7.4 Manual firefighting equipment for Electrical Aircraft (Reserved)

5.7.5 Manual firefighting equipment for Hydrogen Aircraft (Reserved)

Justification: These two new sections will include specific manual firefighting equipment that may be required for these new technologies (i.e., isolation blankets, etc.)

5.7.9.1 **Water-based** fire protection systems installed in accordance with NFPA 11 or NFPA 14 shall be inspected, tested, and maintained in accordance with NFPA 25.

5.7.9.3 Non-water-based fire protection systems shall be inspected, tested, and maintained in accordance with the standard they were installed to.

Justification: This is to notify the user that any system, other than a water-based that is used for fire protection, must be inspected, tested, maintained accordingly whether it is a clean agent, gaseous agent, dry- wet- chemical, water-mist or something new.

5.8 Electrical Aircraft Battery Fire Protection

5.8.1 At site locations where electric aircraft are operated and batteries are recharged and/or stored, a dedicated water source with a minimum rate and duration shall be provided in accordance with NFPA 855.

5.8.2 Water source requirements outlined in 5.8.1 shall be available within 50 feet of each FATO and each parking position.

5.9 Hydrogen Vehicle and Fuel Cell Protection.

5.9.1 Hydrogen vehicle and fuel cell protection shall be in accordance with NFPA 2.

5.10 Energy/Fuel Type Considerations.

5.10.1 Sites that accommodate aircraft of different energy/fuel types shall provide the required fire protection for each energy/fuel type present.

Chapter 6 Rooftop Hangars

6.1 through 6.5 no changes

6.6 Protection of ~~Helicopter~~ Rooftop Hangars.

6.6.1 **Aircraft** ~~Helicopter~~ storage and servicing areas shall be protected in accordance with NFPA 409.

6.2 Rooftop Hangar Floor Drainage.

6.2.1 **Where liquid carbon-based fuels are utilized**, floor drainage systems shall be provided to restrict the spread of fuel in order to reduce fire and explosion hazards from fuel spillage.

6.2.3 Drainage systems in ~~helicopter~~ **aircraft** storage and servicing areas shall be designed and constructed so that they have capacity to prevent buildup of flammable liquids and water over the drain inlet when fire protection systems and hose streams are discharging at the design rate.

6.2.5 The floor pitch provided shall be calculated taking into consideration the towing requirements, **aircraft** ~~helicopter~~ weight, maintenance, and so forth.

6.2.6 Curbs, ramps, or drains shall be provided at all openings from **aircraft** ~~helicopter~~ storage and servicing areas, or the slope of the floor shall be such as to prevent the flow of liquids through the openings.

6.3 Suspended or Elevated Heaters. In the **aircraft** ~~helicopter~~ storage and servicing areas, listed electric, gas, or oil heaters shall be permitted and shall be installed at least 10 ft (3m), both vertically and horizontally, **from all surfaces of the** ~~helicopter engines~~ **aircraft**.

6.8 Aircraft Maintenance

6.8.1 Where aircraft maintenance is performed in a rooftop hangar it shall be conducted in accordance with NFPA 410and the aircraft manufacturer's specifications.

Chapter 7 Water Supply

7.1 No Change

7.2 Calculation of Water Supply for Battery Fires. Where a water supply is provided for the rooftop landing pad area and rooftop hangar, the water supply shall be calculated on the demand for the largest system.

7.3 Where batteries are stored the water supply calculations shall be in accordance with section 4.11 of NFPA 855.

Chapter 8 Offshore Heliports **and Vertiports**

8.1 Plans. Plans for the construction and protection of heliports **and vertiports** located on fixed and mobile offshore installations shall be approve by the AHJ.

8.2 Firefighting Access.

8.2.1 ~~The heliport~~ **All heliports and vertiports** shall have at least one access point for firefighting/rescue personnel.

8.3 Landing Pad Pitch. Heliports **and vertiports** shall be designed to prevent the standing collection of liquids and to prevent liquids from spreading to or spilling onto accommodating spaces or working spaces.

Chapter 9 Portable Fire Extinguishers

9.2 Minimum Requirement. At least one portable fire extinguisher as specified in Table 9.2 shall be provided for each takeoff and landing area, parking area, fuel storage area **and charging site**.

Table 9.2.1 Minimum Ratings of Portable Fire Extinguishers for Vertiport Categories

~~Helicopter~~ **Aircraft** Category	**Overall Length or Controlling Dimension**	Minimum Rating (UL)
H-1	Less than 50 ft (15.2 m)	**TBD***
H-2	50 ft (15.2 m) up to but not including 80 ft (24.4 m)	**TBD***
H-3	80 ft (24.4 m) up to but not including 120 ft (36.6 m)	**TBD***

**RATING CONSIDERATIONS: Besides the potential for Lithium-Ion batteries and Hydrogen fuel or fuel cells, much of the materials to be used in in the construction of eVTOL aircraft will include aluminum, composites, molded plastics, and fiberglass.*

Chapter 11 Battery Storage Locations

11.1 All battery storage locations shall be in accordance with NFPA 855.

Annex E Electric Aircraft Safety Precautions for Heliports and Vertiports

This annex is not a part of the requirements of this NFPA document but is included for informational purposes only.

E.1 General.

E.1.1 Purpose. Rapid advances in technology are are changing the aviation landscape. These advancements are most evident in the fuels and energy sources being utilized for new and modern aircraft. These new fuel sources include electric, hydrogen, and hybrid configurations. This section serves as guidance for aircraft rescue and fire-fighting (ARFF) personnel in preparing a response to these new technologies. The guidance found here can serve as a framework for future innovations that may not yet have been identified, but may appear within your area of operations.

E.2 Electric Power and Energy Storage Systems (ESS). NFPA 855, *Standard for the Installation of Stationary Energy Storage Systems*, should be utilized and considered when preparing for emergencies involving electrically powered aircraft and their support and housing facilities.

E.2.1 Knowledge of Facilities. ARFF personnel should be knowledgeable of the types of work and technology that are being utilized within their response area. NFPA 855 requires specific documents to be presented to the AHJ when these facilities are constructed. ARFF personnel should know that these exist and are available.

E.2.1.1 The plans and specifications associated with an energy storage system (ESS) and its intended installation, replacement or renewal, commissioning, and use shall be submitted to the AHJ for approval and include the following:
(1) Location and layout diagram of the room or area in which the ESS is to be installed
(2) Details on hourly re-resistant-rated assemblies provided or relied upon in relation to the ESS
(3) The quantities and types of ESS units
(4) Manufacturer's specifications, ratings, and listings of ESS
(5) Description of energy storage management systems and their operation
(6) Location and content of required signage
(7) Details on re-suppression, smoke or re-detection, gas detection, thermal management, ventilation, exhaust, and deflagration venting systems, if provided

(8) Support arrangement associated with the installation, including any required seismic support [855:4.1.2.1.1]

E.2.1.2 When batteries are removed from aircraft and other vehicles, they must be properly stored, and their terminals protected. The storage requirements outlined in NFPA 855, Section 14.3, 14.4, and 14.5 should be followed to prevent fire and promote life safety.

E.2.2 Emergency Planning and Training. Fire response personnel and ESS facility managers and operators should coordinate to develop an emergency planand conduct training on that plan. The plan should effectively address hazards associated with on-site systems and how these can be mitigated.

E.2.2.1 The emergency operations plan shall include the following:
(1) Procedures for safe shutdown, de-energizing, or isolation of equipment and systems under emergency conditions to reduce the risk of re, electric shock, and personal injuries, and for safe start-up following cessation of emergency conditions
(2) Procedures for inspection and testing of associated alarms, interlocks, and controls
(3)* Procedures to be followed in response to notifications from the energy storage management system (ESMS), when provided, that could signify potentially dangerous conditions, including shutting down equipment, summoning service and repair personnel, and providing agreed upon notification to re department personnel for off-normal potentially hazardous conditions
(4)* Emergency procedures to be followed in case of re, explosion, release of liquids or vapors, damage to critical moving parts, or other potentially dangerous conditions
(5) Response considerations similar to a safety data sheet (SDS) that will address response safety concerns and extinguishment when an SDS is not required
(6) Procedures for dealing with ESS equipment damaged in a re or other emergency event, including contact information for personnel qualified to safely remove damaged ESS equipment from the facility
(7) Other procedures as determined necessary by the AHJ to provide for the safety of occupants and emergency responders
(8) Procedures and schedules for conducting drills of these procedures [855:4.1.3.2.1.4]

E.2.2.2 Suppression Tactics. ARFF personnel should be aware of the best practices for suppressing fires related to ESS. NFPA 855, Annex C provides guidance for firefighting operations.

E.2.2.2.1 As previously mentioned, battery components are often housed in cabinets or other configurations that can serve to protect the components and thus limit the ability of fire stream penetration. Firefighters should never use piercing nozzles and long penetrating irons. Mechanically damaged cells or puncturing unburned or undamaged cells can result in the immediate ignition of those cells. In addition, internal shorting within the cabinets could create an electrocution risk.

Movement of damaged cells might result in arcing or reignition if active material or cells remain in the modules. Modules should not be moved without consultation from qualified personnel.

Ventilation during suppression is critical. Research has shown that Li-ion batteries might continue to generate flammable gases during and after extinguishing. In addition, testing has shown that during sprinkler suppression, removal of combustion and flammable gases emitted from the battery significantly improves the effectiveness of the suppression.

Testing has shown that electrical current leakage back through hose streams will not be a shock hazard when appropriate streams are used and distances maintained. In cases where systems are thoroughly destroyed and electric potential is shown to be minimal, close range engagement with hoses for the purpose of drowning modules can be performed to provide more direct cooling.

During post-fire operations, self-contained breathing apparatus (SCBA) should continue to be worn by all persons near the damaged ESS, especially when systems are in confined or poorly ventilated spaces or have not been sufficiently cooled yet. Gases, and in particular carbon monoxide (CO), should be monitored during this period, as dangerous buildups have been observed during post-fire testing. If possible, batteries should be monitored for residual heat and temperature, as reignition is a possibility in cells that are not sufficiently cooled.

Care should be taken to secure the area the batteries are located in and ensure that the heat has been removed and that the batteries are not at risk of being electrically shorted or mechanically damaged. This should be done at the guidance of a qualified technician. At this point, the fire scene should be handed over to the owner, operator, or responsible party appointed by the site owner.

Though trace amounts of heavy metals such as nickel and cobalt can be deposited from combustion of the batteries, these elements are not expected to be present in large quantities or in quantities larger than any other similar fire. In most instances, water exposed to the batteries shows very mild acidity, with an approximate pH of 6. Runoff water pH can be monitored during firefighting operations but should not pose a greater risk than normal firefighting run-off.

In unique cases where a system on fire poses little or no risk to the surrounding uninvolved equipment or the environment, it can be reasonable to assume a defensive posture and allow the system to burn itself out. Some typical steps for this approach include the following: local municipal firefighters responding to the scene to make sure that the flames do not spread beyond the property perimeter, having ESS operations personnel arriving at the scene to review the situation and conditions, and then allowing the fire to burn out. This option should only be considered when no risks are posed to the environment and the risk to fire-fighting operations is great or unknown. It is up to the site owner/operator to communicate with fire services in the event of an emergency to relay vital system information to fire services. [855:C.7.3]

Annex F Hydrogen Aircraft Safety Precautions for Heliports and Vertiports

F.1 Hydrogen Technologies. NFPA 2, *Hydrogen Technologies Code,* should be utilized and considered when preparing for emergencies involving hydrogen powered aircraft and their support and housing facilities.

F.1.1 Knowledge of Facilities. Aircraft rescue and fire-fighting (ARFF) personnel should be knowledgeable of the types of work and technology that are being utilized within their response area. NFPA 2 outlines specific requirements for these facilities. ARFF personnel should be aware of these requirements and knowledgeable to the extent that

they exist. Requirements for liquid hydrogen facilities are outlined in Chapter 8 and Chapter 11 of NFPA 2.

F.2 Emergency Planning and Training. Fire response personnel and hydrogen technology facility managers and operators should coordinate to develop an emergency plan, and conduct training on that plan. The plan should effectively address associated hazards and how these can be mitigated.

F.2.1 An emergency plan shall be prepared and updated wherever [GH2 or LH2] are produced, handled, stored, or used in amounts exceeding the maximum allowable quantity (MAQ) per control area or where required by the [AHJ]. 55:4.2.1.1]

F.2.2 The plan shall be available for inspection by the AHJ and shall include the following information:
(1) The type of emergency equipment available and its location
(2) A brief description of any testing or maintenance programs for the available emergency equipment
(3) An indication that hazard identification labeling is provided for each storage area
(4) The location of posted emergency procedures
(5) A safety data sheet (SDS) or equivalent for [GH2 or LH2] stored or used on the site
(6) A list of personnel who are designated and trained to be liaison personnel for the re department and who are responsible for the following:
    (a) Aiding the emergency responders in pre-emergency planning
    (b) Identifying the location of the [GH2 and LH2] stored or used
    (c) Accessing SDSs
    (d) Knowing the site emergency procedures
(7) A list of the types and quantities of [GH2 and LH2] found within the facility [55:4.2.1.2]

F.3 Control and Mitigation of Unauthorized Releases. Provisions shall be made for controlling and mitigating unauthorized releases. [400:6.1.3.2]

F.4 Fire Protection for Fueling Facilities.

F.4.1 All hydrogen refueling station sites shall have a completed risk assessment prior to dispensing fuel. [2:11.2.1.1]

F.4.2 The risk assessment shall be updated when changes to the process affect operating limits or design specifications that were included as the basis for the original risk assessment.[2:11.2.1.2]

F.4.3 Security. LH2 dispensers shall be designed to be tamper resistant.[2:11.2.2]

F.4.4 Operating Instructions. Operating instructions identifying the location and operation of emergency controls shall be posted conspicuously in the facility area.[2:11.2.3]

F.4.5 Lighting. LH2 dispensing areas transferring LH2 during the night shall have permanent lighting at points of transfer and operation.[2:11.2.4]

F.4.5.1 The lighting shall be designed to provide illumination of the dispensing apparatus and dispensing area, such that all controls including emergency shutdown devices are visible to the operator.[2:11.2.4.1]

F.4.7 Personnel Protection. LH2 refueling sites utilizing or dispensing LH2 shall provide personnel protection barriers such as walls, cabinets, vacuum-jacketed pipe, and similar barriers to protect the fueling operator and the vehicle being fueled from contact with a release of LH2 . All facility piping other than the refueling line to the vehicle shall be behind the barrier, to deflect any LH2 that is released due to an equipment malfunction.[2:11.2.5]

F.4.8 Sources of Ignition. Smoking materials, including matches and lighters, shall not be used within [25 ft (7.6 m)] of areas used for fueling, servicing fuel systems of internal combustion engines, or receiving or dispensing of [LH2]. The motors of all equipment being fueled shall be shut off during the fueling operation except for emergency generators, pumps, [pagers], and so forth, where continuing operation is essential. [2:11.2.6]

F.4.9 Fire Extinguishers. Each motor fuel dispensing facility or repair garage shall be provided with fire extinguishers installed, inspected, and maintained as required by NFPA 10. Extinguishers for outside motor fuel dispensing areas shall be provided according to the extra (high) hazard requirements for Class B hazards, except that the maximum travel distance to a 80 B:C extinguisher shall be permitted to be 100 ft (30.48 m). [2:11.2.7]

Annex D Informational References

Add the following informational references:

D.1.1 NFPA Publications.

NFPA 2, Hydrogen Technologies Code, 2020 edition.
NFPA 855, Standard for the Installation of Stationary Energy Storage Systems, 2020 edition.

D.3 References for Extracts in Informational Sections.

NFPA 2, Hydrogen Technologies Code, 2020 edition.
NFPA 55, Compressed Gases and Cryogenic Fluids Code, 2020 edition.
NFPA 400, Hazardous Materials Code, 2022 edition.
NFPA 855, Standard for the Installation of Stationary Energy Storage Systems, 2020 edition.

Additional Comments

The following are additional comments from task group members for considerations by the technical committee:

1. Landing Pad drainage – in the event of a fire, is it possible the water runoff and flame retardant material used to extinguish a fire may become toxic from the battery extinguishing in a fire event? There may need to be consideration given to having a control method to control drainage run off if it is hazardous material. The burden of proof will have to be determined if this were a provision.

2. There should be a minimum clearance noted from any landing pad to any portion of building structure / vertical obstruction.

3. In battery storage areas there should be a sensor / alarm method to detect build-up of gas / smoke / off gassing in the event of an potential fire emergency. There should also be a provision for exhausting the space to prevent the build-up of gas/smoke within a confined storage space.

4. Fire extinguishers (type) should be provided and rated for the fuel source being used by the helicopter/EVTOL vehicles being used at the facility. Spacing typically 75'? unless suppression is provided.

NFPA 853 Standard for the Installation of Stationary Fuel Cell Power Systems

8.2 Fire Prevention and Emergency Planning.
A written fire prevention and emergency plan shall be provided and shall include the following, commensurate with the size and location of the fuel cell power system:

(1) Written information on fire prevention procedures, plant emergency alarms, and egress procedures

(2) Requirements to conduct and document inspections and to identify and address needed remedial actions to correct conditions that increase fire hazards

(3) Written description of the general housekeeping practices and the control of transient combustibles

(4) Written procedures for the handling and storage of flammable and combustible liquids and gases
(5) Written procedures for the control of potential ignition sources

(6) A written procedure that addresses impairments to fire protection systems and other materials, systems, or equipment that affect the level of fire hazards associated with the installation and that also addresses at least identification of equipment not available for service, personnel to be notified, and required enhancement of fire surveillance

(7) Requirements needed to complete a fire report, including an investigation and notification of corrective action to be taken

(8) Listing of frequency and requirements for periodic inspection, testing, and maintenance of the fuel cell power system emergency systems

(9) Signage prohibiting smoking and nonprocess ignition services within protective enclosures and signage that designates areas where smoking is permitted

(10) Posting of the location of the operating instructions and the location of the emergency controls

(11) Requirements for the availability of portable flammable gas detectors at the service entrance to the fuel cell power system installations

(12) Signage providing instructions on the types of fire-suppressing materials that are prohibited and where they are prohibited

(13) Standard color or distinctive marking on all fuel piping and components, with marking in accordance with ANSI A13.1, Scheme for Identification of Piping Systems

(14) Written fire emergency plan that includes the following:

(14)(a) Response to fire alarms and fire system supervisory alarms and notification of personnel identified in the plan

(14)(b) Evacuation of employees and visitors not directly involved in fire-fighting activities for the fire area

(14)(c) Coordination with security forces or other designated personnel to admit public fire department and control traffic and personnel

(14)(d) Fire extinguishment activities and identification of fire water application concerns on operating equipment

(14)(e) Periodic drills to verify viability of the plan

(14)(f) Operator activities during fire emergencies