NFPA No.

418

ROOF-TOP HELIPORT CONSTRUCTION & PROTECTION 1973

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NATIONAL FIRE PROTECTION ASSOCIATION
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Official NFPA Definitions

Adopted Jan. 23, 1964: Revised Dec. 9, 1969. Where variances to these definitions are found, efforts to eliminate such conflicts are in process.

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Standard on

Roof-top Heliport Construction and Protection

NFPA No. 418 — 1973

1973 Edition of No. 418

This Standard was prepared by the NFPA Sectional Committee on Aircraft Hangars and Airport Facilities and submitted to the Association for approval through the NFPA Committee on Aviation, at the 1973 Annual Meeting held in St. Louis, Mo., May 14–18. The Annual Meeting approved the adoption of the Standard in the name of the Association. It replaces the last previous edition adopted by the Association in 1968.

Origin and Development of No. 418

Work on this Standard started in 1965 after the NFPA Sectional Committee on Aircraft Hangars and Airport Facilities was asked to provide guidance on the construction and protection of elevated heliports. Earlier work had been done by the NFPA Sectional Committee on Aircraft Rescue and Fire Fighting regarding fire protection in event of an accident occurring during flight operations and the NFPA Sectional Committee on Aircraft Fuel Servicing worked on safeguards needed to prevent fire accidents during fueling operations at such locations. In 1967 a Tentative Standard on Elevated Heliport Construction and Protection was approved by the Annual Meeting. The 1968 text revised the Tentative Standard (including the change in title).

This 1973 edition is a complete revision of the 1968 edition, separating the mandatory ("shall") provisions from the recommendations which have been placed in the Appendix.

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Standard on

Roof-top Heliport Construction and Protection

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10. Scope

11. This Standard applies to roof-top heliport construction from the viewpoint of possible fire exposure and to appropriate means for the protection of such a facility against damage should a fire occur. This Standard does not apply to offshore structures such as oil-well drilling platforms or lighthouses from which helicopters may operate.

***12.** The load capability of the building, the roof, and related structural conditions such as stair and elevator bulkheads, etc., penthouses and cooling towers, must be considered in the construction of roof-top heliports. None of the aforementioned details is considered in this Standard.

20. Definitions

21. A HELIPORT is a facility designed to accommodate operation of helicopters and includes a landing deck and associated operating facilities.

22. A LANDING DECK is a surface upon which helicopters may land. It may be a specially prepared roof surface or a superstructure above a building roof.

30. Construction

31. Landing deck area shall be of noncombustible and solid construction. The landing deck shall be pitched in one or two directions, terminating in a drain, trough, or type of catch basin so that water or fuel spillage will not be carried over the edge of the building but will be carried off to safe locations. The landing deck shall pitch away from access stairways, elevator shafts, passenger holding rooms, and other occupied areas.

*Asterisk indicates additional information provided in Appendix.

32. The roof on which the landing deck is located shall be of noncombustible construction with a Class A† roof covering.

***33.** Where pits for service or foam extinguishing systems exist, or where emergency escape hatches are used, suitable raised edges around the periphery of such installations shall be provided to prevent any spillage or drainage of fuel from entering the pit or hatchway.

34. Passenger holding areas shall provide shelter from rotor blast or fire exposure.

40. Drainage and Separators

41. The landing deck area drainage system shall be separate from the building drainage system unless all water, oil or residue from the landing deck area passes through an approved, properly ventilated separator of such capacity that it will retain 100 percent of the full fuel load capacity of any helicopter using the landing deck.

42. If a fixed foam system is installed as outlined in paragraph 64, drainage inlets serving the landing deck shall have the capacity to handle the design rate of discharge from the system.

43. Separators shall be periodically inspected and any fuel accumulations disposed of in a safe manner.

44. The drainage piping and separator system shall be protected against freezing in climates where this may be a problem.

50. Landing Deck Egress

***51.** At least two approved means of egress from the landing deck and roof shall be provided and shall be remote from each other. Landing decks provided for commercial helicopter operations shall have at least two enclosed stairways.

NOTE: For further information on exit principles, see Life Safety Code (NFPA No. 101; ANSI A9.1).

60. Fire Protection

61. A manual fire alarm station connected to an approved system for notifying the fire department shall be installed at each point

*Asterisk indicates additional information provided in Appendix.

†As classified in the Methods of Fire Tests of Roof Coverings (NFPA No. 256; ASTM E108; UL No. 790) and further described in the NFPA Manual on Roof Coverings (NFPA No. 203M).

of egress from the heliport. [See NFPA Standard for the Installation, Maintenance and Use of Auxiliary Protective Signaling Systems for Fire Alarm Service (NFPA No. 72B–1972).]

*62. A fixed standpipe system shall extend to the roof level. Sufficient outlets shall be provided to permit effective hose stream coverage of the roof, landing deck and helicopter parking positions without requiring excessive lengths of hose. Such standpipe systems shall be installed in accordance with the Standard on Standpipe and Hose Systems (NFPA No. 14–1973).

*63. Helicopter rescue and fire control recommendations for heliports are given in NFPA No 403–1973; ANSI Z213.1.† For these roof-top heliports, this minimum protection shall be supplied. Where helicopters in Category H-3 are operated, the protection shall be arranged as follows:

*a. At least two foam hose lines supplied from fixed outlets shall be available, each having a capacity of not less than 100 gpm foam water solution. They shall be located remotely from each other and have the ability to discharge effective foam streams to provide coverage of the critical portions of the landing deck and adjacent roof areas. (The area to be protected shall determine the actual number of lines needed.)

b. The air-foam liquid concentrate provided shall be adequate in quantity to permit continuous operation of the required number of hose lines available for a minimum period of fifteen minutes, except where a fixed foam system is installed in accordance with paragraph 64 herein. In the latter case, the hose lines shall be provided with a 7½-minute supply of air-foam liquid concentrate over and above that required for the fixed system.

c. After use, the foam hose line system shall be restored to full operational condition before the heliport can be returned to flight operational status.

*64. In addition to the protection stipulated in paragraph 63 for helicopter rescue and fire control activity and the standpipe and hose equipment specified in paragraph 62, fixed foam systems, supplemented by foam hose lines, may be required for protection against flammable liquid spill fires. Each fixed foam system installation normally shall be engineered for each roof-top heliport to achieve the desired purposes.

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*Asterisk indicates additional information provided in Appendix.

†Recommended Practice for Aircraft Rescue and Fire Fighting Services at Airports and Heliports published in Volume 10 of the National Fire Codes and in separate pamphlet form. See also Appendix to this standard for an extract of this information.

65. All fire protection equipment (including bulk supplies of extinguishing agents for fixed systems) provided on roofs and landing decks shall be protected against extremes of weather (freezing temperatures, snow, icing, and severe exposure to the sun) so as to be fully operational at all times.

66. Automatic sprinklers shall be installed in areas or rooms communicating with the roof or landing deck.

70. Fueling.

71. Fueling of helicopters on roof-top heliports, and the installation and operation of fixed fueling systems at such facilities, where permitted by local regulations, shall be in accordance with the Standard on Aircraft Fuel Servicing (NFPA No. 407–1973; ANSI Z119.1).

Appendix

Recommendations Applicable to Roof-top Heliport Construction and Protection

(In Addition to the Provisions of Sections 30–70 of this Standard to Achieve the Purpose as Defined in Section 10)

A-12. The area of a roof-top heliport may vary from a 40 feet by 40 feet landing deck (devised only to permit clear approach and departure) to a full-size roof area, possibly as large as 200 feet by 200 feet. Private small helicopter operations may require only a limited size elevated pad. Commercial operations need to provide areas of sufficient size so as to permit standard approach and departure operations from one landing spot, taxiing space, and an additional location, free of rotor blast, where passengers may assemble. Applicable national and international standards with regard to obstruction and clearance restrictions must be considered.

A33. Pits for service or foam extinguishing systems should be fitted with appropriate drains, connected to the building drainage system.

A51. Elevators serving roof-top heliports should be provided with emergency electrical energy in event of power failure. Each automatic elevator should be equipped with manual override for use in emergency.

A62. The water standpipe hose system may be modified to be useful as foam hose line protection by the addition of approved combination nozzles, air-foam liquid concentrate, and proportioning equipment.

A63. The following material is an edited, partial extract of the guidance given in the Recommended Practice for Aircraft Rescue and Fire Fighting Services at Airports and Heliports (NFPA No. 403-1973; ANSI Z213.1).

> Heliports designed exclusively for handling helicopter operations are generally limited in area and are separately evaluated as regards helicopter rescue and fire fighting services. For the purposes of this text, the term "heliport" . . . includes "helipads" and "helistops" . . . located . . . on the roofs of buildings. The degree of fire protection recommended depends on the size of the helicopters, the number of occupants, the maximum operational fuel load of the helicopters using the facility, personnel available for rescue and fire fighting purposes, and the frequency of operations.

Protection at Heliports for Helicopter Operations

a. The Table indicates the quantities of water (for foam production) and the quantity of dry chemical that are recommended for heliports categorized as follows:

Fire Protection for Helicopter Rescue and Fire Control Operations

Heliport Category	Water for Foam Production Using Protein or Fluoroprotein Foam Concentrates††				Foam Compatible Dry Chemical (Rating)*	Additional Water for Foam if Heliport Is Elevated	
	Amount of Water		Total Rate of Discharge				
	Gallons	Liters	GPM	Liters		Gallons	Liters
H-1	None**	None**	None**	None**	2–80B:C Extinguishers	None**	None**
H-2	500†	1,900†	100	380	2–80B:C Extinguishers **or** 1–160B:C Wheeled Extinguisher	1000†	3,800†
H-3	1500†	5,700†	200 from two 100 gpm nozzles or from one mobile unit with a turret	760	2–80B:C Extinguishers **and** 1–160B:C Wheeled Extinguisher	1500†	5,700†

*See Standard on Installation of Portable Fire Extinguishers (NFPA No. 10; ANSI Z112.1).

**Many times a water supply meeting the suggestions for Category H-2 may be readily available. In such cases it should be made available assuming personnel are available to utilize the equipment in event of an emergency.

†This amount of water should be immediately available from a hydrant (standpipe), pressurized tank, reservoir, or mobile vehicle so that it can be dispensed at the rates indicated and at a satisfactory pressure. Additional water should be available to provide a continuing rescue and fire fighting capability wherever feasible.

††The quantity of water may be reduced one-third when aqueous film-forming foam concentrate is used.

H-1 — This category includes all heliports where the helicopters using the facility carry less than six persons and have operational fuel loads of less than 100 gallons (380 liters).

H-2 — This category includes all heliports where the helicopters using the facility normally carry less than 12 passengers, have operational fuel loads of less then 200 gallons (760 liters), and where the number of movements exceeds an average of four movements per day over any three-month period. (Where the frequency of movements is less than that specified, the decision as to whether to apply these recommendations should be based on a judgment of the heliport management and any regulatory agency having jurisdiction.)

H-3 — This category includes all heliports where the helicopters using the facility normally carry 12 or more passengers and have operational fuel loads of more than 200 gallons (760 liters), regardless of the frequency of movements.

b. For effective use of the fire protection recommended for heliports in categories H-2 and H-3, it is important that the extinguishing equipment be capable of discharging the agents at the rates indicated. The foam rates are those which provide the maximum nozzle flow rate capable of being handled by one man. The amount of agents and rates suggested should be sufficient, in the hands of trained operators, to provide initial fire control, thus permitting occupants to evacuate or be rescued, assuming that they are not incapacitated or killed on impact. Additional water is recommended to permit complete extinguishment.

NOTE: Where a standpipe or other continuous water supply of sufficient pressure and volume is available, it should be used to supply the foam system. If a continuous water supply of adequate volume but insufficient pressure is available, an automatic booster pump should be provided.

c. Fire extinguishers, foam nozzles, hose reels, etc., located on heliports should, where necessary, be in weatherproof . . . cabinets, clearly marked as to their contents. Cabinets should be located beyond but within five feet (1.5 meters) of the boundary line defining the landing deck and shall not protrude into the normal approach-departure paths. These cabinets should be located diametrically opposite each other.

d. Foam nozzles should be light in weight and capable of discharging foam, dispersed pattern foam, or water spray.

g. An automatic alarm should be provided to indicate foam system operation and to summon aid.

A63.a. Hose lines should preferably be of the reel type, arranged for full operation with all or a portion of the hose unreeled. Operating controls should be of the quick-acting, quarter-turn type. Hose nozzles should be of the shutoff type or should have a shutoff valve at the nozzle inlet.

A64. The following guidelines are offered for the installation of fixed foam systems:

a. Peripheral approved fixed foam discharge nozzles should be installed to provide protection for the entire landing deck, but not necessarily for the entire roof area of the building and the helicopter parking positions, if the landing deck is a clearly defined

and marked-out space with adequate provision to prevent the flow of flammable liquids to other parts of the building roof area. The foam solution discharge should be at a rate of at least 0.16 gallons per minute per square foot and an adequate quantity of the extinguishing agent should be available to continue this discharge for at least fifteen minutes, with start of discharge occurring not more than 10 seconds after system actuation.

b. The foam discharge nozzles may be installed at deck level, or as fixed or oscillating turrets.

c. The effect of air turbulence and wind conditions on the range and distribution of the foam streams should be considered in the design of such a system.

d. Operation of the fixed foam system should be from emergency control stations located at points of egress. An additional control station may be provided in the heliport control room, if such exists. Heliport personnel should be trained in the operation of the system.

e. The Standard on Foam Extinguishing Systems (NFPA No. 11), the Standard for Foam-Water Sprinkler and Foam-Water Spray Systems (NFPA No. 16), and the Standard on Aircraft Hangars (No. 409; ANSI Z214.1) should be referred to when designing fixed foam systems for this service.