

NFPA

418

ROOF-TOP HELIPORT CONSTRUCTION & PROTECTION 1979



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Standard on Roof-top Heliport Construction and Protection

NFPA 418 — 1979

1979 Edition of NFPA 418

This 1979 edition of NFPA 418, *Standard on Roof-top Heliport Construction and Protection* was prepared by the Technical Committee on Airport Facilities and was adopted by the National Fire Protection Association, Inc. on May 16, 1979 at its Annual Meeting in St. Louis, MO. It was released by the Standards Council on June 11, 1979.

This edition of the standard is a revision of the 1973 edition.

Changes other than editorial are denoted by a vertical line in the margin of the pages in which they appear.

Origin and Development of NFPA 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). The 1973 edition was a complete revision of the 1968 edition. Further amendments were made in 1979.

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NOTICE

An asterisk (*) following the number or letter designating a paragraph indicates explanatory material on that paragraph in Appendix A.

Information on referenced publications can be found in Appendix B.

Chapter 1 General

1-1 Scope.

1-1.1 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.

1-1.2* 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 are considered in this standard.

Chapter 2 Definitions and Units

2-1 Definitions.

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

Landing Deck. A surface upon which helicopters may land. It may be a specially prepared roof surface or a superstructure above a building roof.

2-2 Units. Metric units of measurement in this standard are in accordance with the modernized metric system known as the International System of Units (SI). One unit (liter), outside of but recognized by SI, is commonly used in international fire protection.

NOTE: For additional conversions and information, see ASTM E380, *Standard for Metric Practice*.

2-2.1 If a value for measurement as given in this standard is followed by an equivalent value in other units, the first stated is to be regarded as the requirement. A given equivalent value may be approximate.

2-2.2 The conversion procedure for the SI units has been to multiply the quantity by the conversion factor and then round the result to the appropriate number of significant digits.

Chapter 3 Construction

3-1 Construction.

3-1.1 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.

3-1.2 The roof on which the landing deck is located shall be of noncombustible construction utilizing noncombustible insulation and a noncombustible roof covering.

3-1.3* Where pits for service or for 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.

3-1.4 Passenger holding areas shall provide shelter from rotor blast or fire exposure.

Chapter 4 Drainage and Separators

4-1 Drainage and Separators.

4-1.1 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.

4-1.2 If a fixed foam system is installed, drainage inlets serving the landing deck shall have the capacity to handle the design rate of discharge from the system. (*See A-6-1.4(b) of Appendix A.*)

4-1.3 Separators shall be periodically inspected and any fuel accumulations disposed of in a safe manner.

4-1.4 The drainage piping and separator system shall be protected against freezing in climates where this may be a problem.

Chapter 5 Egress

5-1 Landing Deck Egress.

5-1.1* 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 101®.

Chapter 6 Fire Protection

6-1 Fire Protection.

6-1.1 A manual fire alarm station connected to an approved system for notifying the fire department shall be installed at each point of egress from the heliport. (*See Standard for the Installation, Maintenance and Use of Central Station Signaling Systems, NFPA 71; Standard for the Installation, Maintenance and Use of Auxiliary Protective Signaling Systems, NFPA 72B; Standard for the Installation, Maintenance and Use of Remote Station Protective Signaling Systems, NFPA 72C; and Standard for the Installation, Maintenance and Use of Proprietary Protective Signaling Systems for Watchman, Fire Alarm and Supervisory Service, NFPA 72D.*)

6-1.2* A Class III 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 14.

6-1.3* Table 6-1.3 indicates the quantities of water for foam production (using protein or fluoroprotein foam concentrates) and the quantities of dry chemical that are recommended for heliports categorized as follows. The quantities 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 6 persons and have operational fuel loads of less than 100 gal (380 L).

H-2 — This category includes all heliports where the helicopters using the facility normally carry more than 6 and less than 12 passengers and have operational fuel loads of less than 200 gal (760 L).

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 gal (760 L).

Table 6-1.3 Heliport — Recommended Amounts of Extinguishing Agents

Heliport Category	Water for AFFF Production				or Water for Protein Fluoroprotein Foam Production				Dry Chemical (Note 1)			
			Discharge Rates				Discharge Rates				Discharge Rates	
	Gal (U.S.)	Liter	GPM	Liter/Min	Gal (U.S.)	Liter	GPM	Liter/Min	Lb	Kg	Lb/Min	Kg/Min
H-1	(Note 2)		(Note 2)		(Note 2)		(Note 2)		100	45	100	45
H-2	200†	760†	100	380	300†	1140†	150	570	200	90	200	90
H-3	335†	1265†	200	760	500†	1900†	300	1140	300	135	300	135

Note 1: When used with protein or fluoroprotein foam, foam compatible-type dry chemical is required. Dry chemical in containers weighing in excess of 50 lbs (2.25 kg) should be equipped with auxiliary wheeled carriers. (See also *Standard on Installation of Portable Fire Extinguishers, NFPA 10.*)

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

†Note 3: This amount of water should be immediately available from a hydrant (standpipe), pressurized tank, reservoir, cistern, or mobile vehicle so that it can be dispensed at the discharge rate indicated and at a satisfactory pressure. Additional water should be available to provide a continuing rescue and fire fighting capability wherever feasible.

6-1.4 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 (380 L) 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 ten minutes, except where a fixed foam system is installed. In the latter case, the hose lines shall be provided with a 5-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 turned to flight operational status.

6-1.5 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.

6-1.6 Automatic sprinklers shall be installed in areas or rooms communicating with the roof or landing deck.

Chapter 7 Fueling

7-1 Fueling.

7-1.1 Fueling on elevated heliports shall be arranged and handled in accordance with the requirements contained in Chapter 6 of the *Standard for Aircraft Fuel Servicing*, NFPA 407.

Appendix A

Recommendations Applicable to Roof-top Heliport Construction and Protection

This Appendix is not a part of this NFPA Standard 418, Roof-top Heliport Construction and Protection, but is included for information purposes only

The following notes, bearing the same number as the text of the *Standard on Roof-top Heliport Construction and Protection*, NFPA 418, to which they apply, contain useful explanatory material and references to standards.

A-1-1.2 The area of a roof-top heliport may vary from a 40 ft by 40 ft (12 m by 12 m) landing deck (designed only to permit clear approach and departure) to a full-size roof area, possibly as large as 200 ft by 200 ft (60 m by 60 m). 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.

A-3-1.3 Pits for service or foam extinguishing systems should be fitted with appropriate drains, connected to the building drainage system.

A-5-1.1 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.

A-6-1.2 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.

A-6-1.3 It should be noted that the requirements indicated for helicopter rescue and fire control operations, Table 6-1.3, are not limited to roof-top heliports but are applicable to any heliports. (See *Recommended Practice for Aircraft Rescue and Fire Fighting Services at Airports and Heliports*, NFPA 403.) Roof-top heliport protection requirements in 6-1.4 of this standard exceed these requirements in some cases.

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 and the maximum operational fuel load of the helicopters using the facility.

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 (using protein or fluoroprotein concentrates) are those which provide the maximum nozzle flow rate capable of being handled by one man. The amount of agents and rates recommended 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.

Fire extinguishers, foam nozzles, hose reels, etc., located on heliports, should, where necessary, be in weatherproof, abovegrade cabinets, clearly marked as to their contents. Cabinets should be located beyond but not in excess of 20 ft (6.1 m) of the boundary line defining the landing and takeoff area and shall not protrude into the normal approach-departure paths. These cabinets should be located diametrically opposite each other.

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

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

A-6-1.4(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.

A-6-1.4(b) 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.

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 gal per min per sq ft [6.52 (L/min)/m²] when using protein or fluoroprotein foam concentrate, and a rate of 0.10 gal per min per sq ft [4.07 (L/min)/m²] when using AFFF foam concentrate, and an adequate quantity of the extinguishing agent should be available to continue this discharge for at least 10 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 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 11, the *Standard for Foam-Water Sprinkler and Foam-Water Spray Systems*, NFPA 16, and the *Standard on Aircraft Hangars*, NFPA 409, should be referred to when designing fixed foam systems for this service.

(f) It is recommended that trained personnel (who may be normally assigned to other duties in the building) report to the roof-top heliport several minutes before the landing or the takeoff of a helicopter and remain there until the completion of the landing or takeoff operation, and be ready to use the fire protection systems.