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AIRCRAFT FUELING RAMP DRAINAGE 1983

NATIONAL FIRE PROTECTION ASSOCIATION, INC.
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Standard on

Aircraft Fueling Ramp Drainage

NFPA 415-1983

1983 Edition of NFPA 415

This edition of NFPA 415, *Standard for Aircraft Fueling Ramp Drainage*, was prepared by the Technical Committee on Airport Facilities, released by the Correlating Committee on Aviation, and acted on by the National Fire Protection Association, Inc. on November 17, 1982 at its Fall Meeting in Philadephia, Pennsylvania. It was issed by the Standards Council on December 7, 1982 with an effective date of December 27, 1982 and supersedes all previous editions.

The 1983 edition of this document has been approved by the American National Standards Institute.

Origin and Development of NFPA 415

In 1960, the Committee secured Tentative Adoption of this Standard and Official Adoption followed in 1961. In compliance with NFPA Regulations Governing Technical Committees, the 1961 edition was reviewed by the Committee for reconfirmation in 1966, a five-year period having passed. In 1966 one paragraph was added and two of the diagrams were redrawn to improve legibility. In 1973 the standard was revised to separate the mandatory ("shall") provisions from other recommendations which have been placed in the Appendix. The standard was reconfirmed in 1977 and 1982.

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NOTE: Membership on a Committee shall not in and of itself constitute an endorsement of the Association or any document developed by the Committee on which the member serves.

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

Information on referenced publications can be found in Appendix B.

Chapter 1 General

1-1 Definitions and Units.

1-1.1 Definitions.

Aircraft Fueling Ramp. Any outdoor area at an airport, including aprons and hardstands, on which aircraft are normally fueled or defueled.

Shall. Indicates a mandatory requirement.

Should. Indicates a recommendation or that which is advised but not required.

1-1.2 Units. Metric units of measurement in this standard are in accordance with the modernized metric system known as the International System of Units (SI). Two units (liter and bar), outside of but recognized by SI, are commonly used in international fire protection. These units are listed in Table 1-1.2 with conversion factors.

1-1.2.1 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.

1-1.2.2 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.

Table 1-1.2

Name of Unit	Unit Symbol	Conversion Factor
liter	L	1 gal = 3.785 L
liter per minute per square meter	$L/min/m^2$	1 gpm/ft^2 = 40.746 $L/min/m^2$
cubic decimeter	dm^3	1 gal = 3.785 dm^3
pascal	Pa	1 psi = 6894.757 Pa
bar	bar	1 psi = 0.0689 bar
bar	bar	1 bar = 10^5 Pa

For additional conversions and information see ASTM E380, *Standard for Metric Practice* (*see Appendix B*).

1-2 Scope.

1-2.1 The requirements specified herein provide standards for the design of the water drainage system of an aircraft fueling ramp to control the flow of fuel which may be spilled on a ramp and to minimize the resultant possible danger therefrom. Such a drainage system is intended:

(a) To limit spread of the fuel spill to aircraft loading walkways, structures, passenger loading fingers, or concourses, which might result in the liquid or vapors therefrom reaching a source of ignition or might result in the accumulation of dangerous or toxic vapors therein. See NFPA 407, *Aircraft Fuel Servicing*; NFPA 417, *Aircraft Loading Walkways*; NFPA 409, *Aircraft Hangars*; and NFPA 416, *Airport Terminal Buildings*. (*See Appendix B.*)

(b) To limit spread of the fuel spill over large areas of the ramp surface and to prevent the transmission of vapors by the drainage system from exposing a number of aircraft or other equipment parked or operating on the ramp.

(c) To limit continued exposure of the spilled liquids to the air and the uncontrolled vaporization of the fuel on ramp surfaces which might result in the creation of serious fire hazard exposure conditions or the release of uncontrolled quantities of vapors creating potential hazards to life and property.

(d) To provide for the safe disposal of fuel spillage (*see also 2-1.3*).

Chapter 2 Design

2-1 Aircraft Fueling Ramp Slope and Drain Design.

2-1.1* Aircraft fueling ramps shall slope away from terminal building, fingers, aircraft hangars, aircraft loading walkways, or other structures, with a minimum grade of one percent (1:100) for the first 50 ft (15.2 m). Beyond this distance, the slope to drainage inlets may be reduced to a minimum of 0.5 percent (1:200). Drainage inlets, where provided, shall be a minimum of 50 ft (15.2 m) from such structures.

2-1.2* Effective aircraft fueling ramp drainage as specified herein may be accomplished by any one or a combination of the following methods:

(a) Use of drain inlets with connected piping.

(b) Use of open grate trenches as a collection means with connected piping.

(c) Sloping of the ramp.

2-1.3 The water drainage system of any aircraft fueling ramp shall be so arranged that the fuel or its vapor cannot normally enter into the drainage system of: buildings, areas utilized for automobile parking, public or private streets, or the public side of airport terminal or aircraft hangar structures. In no case shall the design allow fuel to collect on the aircraft fueling ramp or adjacent ground surfaces where it may constitute a fire hazard, or result in a hazardous subsurface accumulation of such fuel.

2-1.4* Aircraft loading walkways shall not be located over any drainage inlet.

2-1.5 The final separator or interceptor for the entire airport drainage system shall be adequate to prevent disposal of combustible quantities of flammable liquids into adjoining properties or waterways.

2-1.6 Grates and drain covers shall be removable to facilitate cleaning and flushing.

2-1.7 If open grate drainage trenches are used as a collection means, such open trenches, including branches, shall not be over 125 ft (38.1 m) in length with a minimum interval of 6 ft (1.8 m) between

open trench sections to act as fire stops. Each 125-ft (38.1-m) section shall be individually drained through underground piping. Open trenches shall not be used where they are in line of pedestrian or passenger traffic.

2-1.8 Underground piping and components used in drainage systems shall be noncombustible and inert to fuel.

Chapter 3 Maintenance

3-1 Drain and Separator Maintenance.

3-1.1* Periodic maintenance checks shall be conducted of all ramp drainage systems and interceptors to assure that they are clear of obstructions and function properly.

3-1.2 Large volume flushing with water shall be conducted through appropriate drainage elements after any large fuel spill on the aircraft fueling ramp enters the drainage system.

Appendix A Explanatory Material

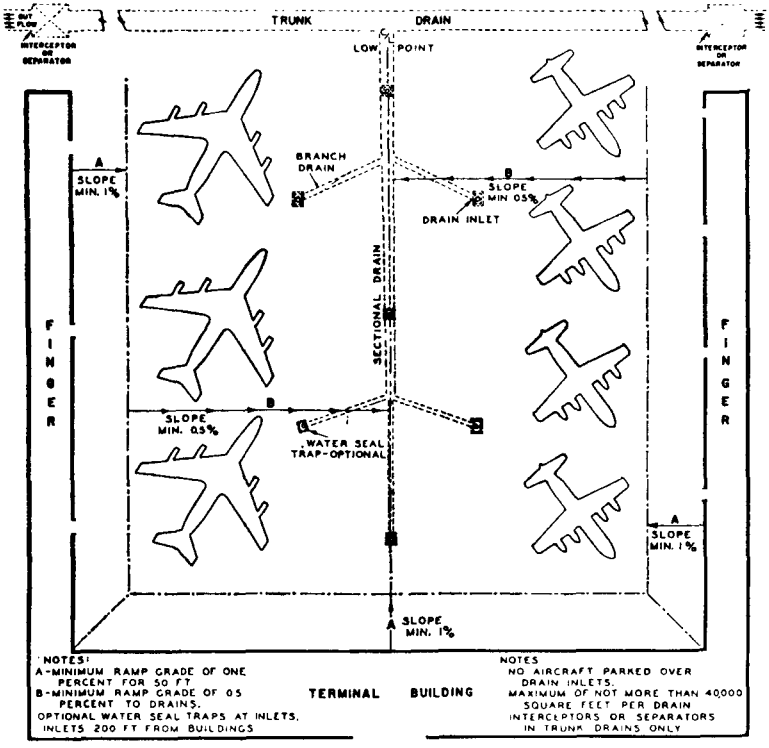
This Appendix is not a part of the requirements of this NFPA document. . . but is included for information purposes only.

A-2-1.1 Consideration should be given to the hydraulic problem in disposal of surface water, safe disposal of fuel which might be spilled on the ramp, and the gradient to be overcome in the movement of aircraft. A ratio of 40,000 sq ft (3716 m^2) per drainage inlet should not be exceeded with minimum flow distances to drains but with drain inlets located so as not to endanger aircraft placements within the ramp area so described.

A-2-1.2 The use of slopes alone on aircraft fueling ramps is the least desirable method. The use of slopes and open grate trenches as a collection means with connected piping to dispose of fuel spills is preferable to the use of slopes alone, but is not as desirable for major airports as the use of slopes and drain inlets with connected piping. Figures A-2-1.2 (a) and (b) diagrammatically illustrate two possible fueling ramp drainage arrangements.

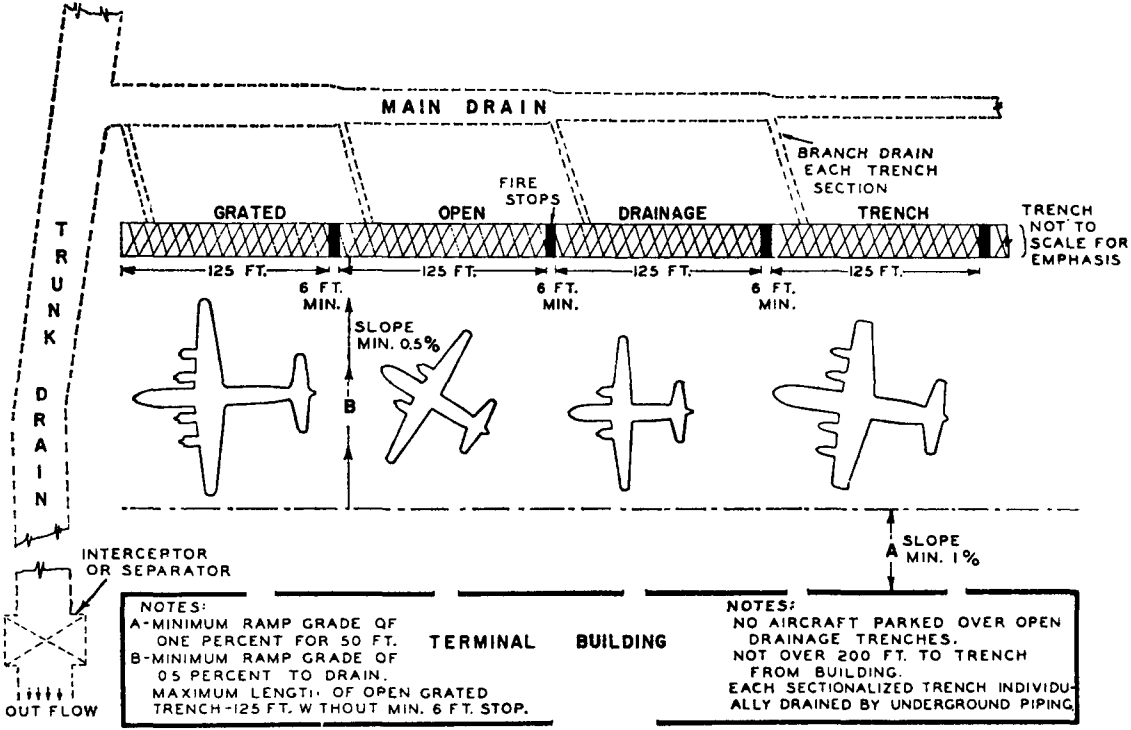
A-2.1.4 It is recommended that personnel responsible for locating the aircraft during fueling be informed on the purposes of the drainage system used and the importance of properly locating aircraft with respect to the drainage system provided.

A-3-1.1 It is suggested that maintenance checks be conducted at least four times a year and more often if climatic or other local conditions dictate. Observations made during rain storms can serve as a suitable check for safisfactory operation of the drainage system.



For SI Units: 1 ft = 0.0348 m.

Figure A-2-1.2 (a) One possible arrangement of an aircraft fueling ramp drainage system using the optional trapped drain inlets.



For SI Units: 1 ft = 0.0348 m.

Figure A-2-1.2 (b) Another possible arrangement of an aircraft fueling ramp drainage system using a grated open drainage trench.

Appendix B Referenced Publications

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

B-1 Referenced Publications.

B-1.1 NFPA Publications. The following publications are available from the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

NFPA 407-1980, *Aircraft Fuel Servicing.*
NFPA 409-1979, *Aircraft Hangars.*
NFPA 416-1983, *Airport Terminal Buildings*
NFPA 417-1977, *Aircraft Loading Walkways.*

B-1-2 This publication makes reference to the following code and the year date shown indicates the latest edition available.

Publication designated ASTM is available from the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103.

ASTM E380-1976, *Standard for Metric Practice.*