

490

NFPA 490
Storage of
Ammonium
Nitrate
1993 Edition



National Fire Protection Association, 1 Batterymarch Park, PO Box 9101, Quincy, MA 02269-9101
An International Standards-Making Organization

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There is a concern that the growing use of synthetic materials may produce more or additional toxic products of combustion in a fire environment. The Board has, therefore, asked all NFPA technical committees to review the documents for which they are responsible to be sure that the documents respond to this current concern. To assist the committees in meeting this request, the Board has appointed an advisory committee to provide specific guidance to the technical committees on questions relating to assessing the hazards of the products of combustion.

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NFPA 490
Code for the
Storage of Ammonium Nitrate
1993 Edition

This edition of NFPA 490, *Code for the Storage of Ammonium Nitrate*, was prepared by the Technical Committee on Hazardous Chemicals and acted on by the National Fire Protection Association, Inc. at its Fall Meeting held November 16-18, 1992, in Dallas, TX. It was issued by the Standards Council on January 15, 1993, with an effective date of February 12, 1993, and supersedes all previous editions.

The 1993 edition of this document has been approved by the American National Standards Institute.

Changes other than editorial are indicated by a vertical rule in the margin of the pages on which they appear. These lines are included as an aid to the user in identifying changes from the previous edition.

Origin and Development of NFPA 490

NFPA 490 was developed by the Technical Committee on Storage, Handling, and Transportation of Hazardous Chemicals and was tentatively adopted by the Association in 1963. It was further amended and again tentatively adopted in 1964. After further revision, it was officially adopted in 1965. Amendments to NFPA 490 were adopted in 1967, 1969, and 1970. A complete revision was adopted in 1975 and several minor amendments were adopted in 1980 and 1985.

The 1993 edition of NFPA 490 incorporates amendments to the document to enhance its enforceability by revising nonmandatory language provisions and conformance with the NFPA *Manual of Style*.

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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.

Committee Scope: To develop and maintain current codes for classes of hazardous chemicals and codes for specific chemicals when these are warranted by virtue of widespread distribution or special hazards.

Contents

Chapter 1 Scope and Definitions	490- 4	Chapter 6 General Precautions	490- 7
1-1 Scope	490- 4	6-1 Electrical Installations	490- 7
1-2 Purpose	490- 4	6-2 Housekeeping	490- 7
1-3 Definitions	490- 4	6-3 Sources of Ignition	490- 7
Chapter 2 General Provisions	490- 5	6-4 Signs	490- 7
2-1 Application	490- 5	6-5 Vehicles and Lift Trucks	490- 7
2-2 Restricted Locations	490- 5	6-6 Handling Equipment	490- 7
2-3 Structures	490- 5	6-7 Lightning	490- 7
Chapter 3 Storage of Ammonium Nitrate in Bags, Drums, or Other Containers	490- 6	6-8 Control of Access	490- 7
3-1 Containers	490- 6	Chapter 7 Fire Protection	490- 7
3-2 Piles	490- 6	7-1 Automatic Sprinklers	490- 7
Chapter 4 Storage of Bulk Ammonium Nitrate	490- 6	7-2 Extinguishing Devices	490- 7
4-1 Structures	490- 6	Chapter 8 Referenced Publications	490- 8
4-2 Compartments	490- 6	Appendix A Explanatory Notes	490- 8
4-3 Piles	490- 6	Appendix B Suggested Fire Fighting Procedure	490- 8
Chapter 5 Contaminants	490- 6	Appendix C Suggested Provisions for Municipal Legal Regulations	490- 8
5-1 Separation	490- 6	Appendix D Referenced Publications	490-10
5-2 Prohibited Articles	490- 7	Index	490-10

NFPA 490**Code for the****Storage of Ammonium Nitrate****1993 Edition**

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 Chapter 8 and Appendix D.

Foreword

Ammonium nitrate¹ is a compound containing nitrogen, hydrogen, and oxygen (NH_4NO_3) and is commercially produced by reacting nitric acid with ammonia, evaporating the resultant solution of ammonium nitrate to make a concentrated ammonium nitrate melt, which is then spray granulated in a prilling tower or pelletized or flaked by some other means.

For interstate shipments, the Department of Transportation of the United States classifies ammonium nitrate as an oxidizing material, as it does some other fertilizer products such as sodium nitrate, potassium nitrate, and calcium nitrate. Such oxidizing materials can yield oxygen upon decomposition under fire conditions and will, therefore, under proper conditions of mixing, vigorously support combustion if involved in a fire with combustible materials. Ammonium nitrate is capable of undergoing detonation with about half the blast effect of explosives, if heated under confinement that permits high pressure build-up, or if subjected to strong shocks, such as those from an explosive. The sensitivity of ammonium nitrate to detonation increases at elevated temperatures.

Industrial use of ammonium nitrate extends to its use as an ingredient in blasting agents. When a carbonaceous or organic substance such as fuel (or diesel) oil, nut hulls, or carbon black is added and admixed with ammonium nitrate, the mixture may become a blasting agent. A blasting agent is defined as being any material or mixture, consisting of a fuel and oxidizer, intended for blasting, not otherwise classed as an explosive and in which none of the ingredients is classified as an explosive, provided that the finished product, as mixed and packaged for use or shipment, cannot be detonated by means of a No. 8 test blasting cap when unconfined. (See NFPA 495, *Explosive Materials Code*.)

Recent test data on ammonium nitrate are included in the U.S. Bureau of Mines Report of Investigations 6746, *Sympathetic Detonation of Ammonium Nitrate and Ammonium Nitrate Fuel Oil*; Report of Investigations 6903, *Further Studies of Sympathetic Detonation*; and Report of Investigations 6773, *Explosion Hazards of Ammonium Nitrate Under Fire Exposure*. On the basis of these reports a Table of Distances of Ammonium Nitrate and Blasting Agents from

Explosives or Blasting Agents has been developed. The table is included in Appendix C of NFPA 495, *Explosive Materials Code*.

While blasting agents should not be confused with fertilizer products, extreme care should be taken to ensure that stored ammonium nitrate does not become sensitized by intimate mixing with carbonaceous, organic, or combustible material.

Mixed fertilizers containing less than 60 percent ammonium nitrate are not covered by this code.

With proper precautions against fire and explosion, ammonium nitrate can be stored safely at the plant, in distributors' warehouses, or on the farm.

Chapter 1 Scope and Definitions**1-1 Scope.**

1-1.1 This code shall apply to the storage of ammonium nitrate in the form of crystals, flakes, grains, or prills including fertilizer grade (as defined by *Definitions and Test Procedures for Ammonium Nitrate Fertilizer*), dynamite grade, nitrous oxide grade [as defined by *Standard for Ammonium Nitrate (Nitrous Oxide Grade)*], technical grade, and other mixtures containing 60 percent or more by weight of ammonium nitrate.

1-1.2 It shall not apply to the transportation of ammonium nitrate.

1-1.3 It shall not apply to storage under the jurisdiction of and in compliance with the regulations of the United States Coast Guard.

1-1.4 This code shall not apply to ammonium nitrate-based blasting agents. (See NFPA 495, *Explosive Materials Code*.)

1-1.5 The storage of ammonium nitrate and ammonium nitrate mixtures that are more sensitive than allowed by the *Definitions and Test Procedures for Ammonium Nitrate Fertilizer* shall not be permitted by this code except on the specific approval of the authority having jurisdiction.

1-1.6 Nothing in this code shall apply to the production of ammonium nitrate or to the storage of ammonium nitrate on the premises of the producing plant, provided that no distinct undue hazard to the public is created.

1-2 Purpose. The purpose of this code is to provide for the safe storage of fertilizer grade ammonium nitrate.

1-3 Definitions.

Approved. Acceptable to the "authority having jurisdiction."

NOTE: The National Fire Protection Association does not approve, inspect or certify any installations, procedures, equipment, or materials nor does it approve or evaluate testing laboratories. In determining the acceptability of installations or procedures, equipment or materials, the

¹The term as used in this publication refers only to solid forms of ammonium nitrate.

authority having jurisdiction may base acceptance on compliance with NFPA or other appropriate standards. In the absence of such standards, said authority may require evidence of proper installation, procedure or use. The authority having jurisdiction may also refer to the listings or labeling practices of an organization concerned with product evaluations which is in a position to determine compliance with appropriate standards for the current production of listed items.

Authority Having Jurisdiction. The "authority having jurisdiction" is the organization, office or individual responsible for "approving" equipment, an installation or a procedure.

NOTE: The phrase "authority having jurisdiction" is used in NFPA documents in a broad manner since jurisdictions and "approval" agencies vary as do their responsibilities. Where public safety is primary, the "authority having jurisdiction" may be a federal, state, local or other regional department or individual such as a fire chief, fire marshal, chief of a fire prevention bureau, labor department, health department, building official, electrical inspector, or others having statutory authority. For insurance purposes, an insurance inspection department, rating bureau, or other insurance company representative may be the "authority having jurisdiction." In many circumstances the property owner or his designated agent assumes the role of the "authority having jurisdiction"; at government installations, the commanding officer or departmental official may be the "authority having jurisdiction."

Labeled. Equipment or materials to which has been attached a label, symbol or other identifying mark of an organization acceptable to the "authority having jurisdiction" and concerned with product evaluation, that maintains periodic inspection of production of labeled equipment or materials and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.

Listed. Equipment or materials included in a list published by an organization acceptable to the "authority having jurisdiction" and concerned with product evaluation, that maintains periodic inspection of production of listed equipment or materials and whose listing states either that the equipment or material meets appropriate standards or has been tested and found suitable for use in a specified manner.

NOTE: The means for identifying listed equipment may vary for each organization concerned with product evaluation, some of which do not recognize equipment as listed unless it is also labeled. The "authority having jurisdiction" should utilize the system employed by the listing organization to identify a listed product.

Shall. Indicates a mandatory requirement.

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

Chapter 2 General Provisions

2-1 Application. This code shall apply to all persons, firms, corporations, co-partnerships, and associations storing, having, or keeping ammonium nitrate and to the

owner or lessee of any building, premises, or structure in which ammonium nitrate is stored in quantities of 1,000 lb (454 kg) or more.

2-2 Restricted Locations.

2-2.1 A permit shall be required from the authority having jurisdiction for the storage of 1,000 lb (454 kg) or more of ammonium nitrate.

2-2.2 Not more than 60 tons (54.4 metric tons) of ammonium nitrate shall be stored unless the location and storage facility have been approved.

2-2.3 Storage locations shall be subject to approval by the authority having jurisdiction with respect to nearness of residential occupancies, places of public assembly, schools, hospitals, railroads, and public highways. Limitations on storable quantities shall be considered with regard to proximity of these exposures and congested commercial or industrial districts.

2-2.4* Approval of large quantity storage shall be subject to due consideration of the fire and explosion hazards, including exposure to toxic vapors from burning or decomposing ammonium nitrate.

2-3 Structures.

2-3.1 Storage buildings shall not have basements unless the basements are open on at least one side. Storage buildings shall not be over one story in height, unless approved for such use.

2-3.2 Storage buildings shall have adequate ventilation or be of a construction that will be self-ventilating in the event of fire.

2-3.3 The wall on the exposed side of a storage building within 50 ft (15.2 m) of a combustible building, forest, piles of combustible materials, and similar exposure hazards shall be of Type I construction, as described in NFPA 220, *Standard on Types of Building Construction*. In lieu of the Type I wall, other equivalent means of exposure protection such as a free standing wall shall be permitted to be used. The roof coverings shall be Class C or better. (See NFPA 203, *Guideline on Roof Coverings and Roof Deck Constructions*.)

2-3.4 All flooring in storage and handling areas shall be of noncombustible material or protected against impregnation by ammonium nitrate and shall be without open drains, traps, tunnels, pits, or pockets into which any molten ammonium nitrate could flow and be confined in the event of fire.

2-3.5 The continued use of an existing storage building or structure not in strict conformity with this code shall be approved by the authority having jurisdiction in cases where such continued use will not constitute a hazard to life or adjoining property.

2-3.6 Buildings and structures shall be dry and free from water seepage through the roof, walls, and floors.

Chapter 3 Storage of Ammonium Nitrate in Bags, Drums, or Other Containers

3-1 Containers.

3-1.1 Bags and containers used for ammonium nitrate shall comply with the specifications and standards established by the U.S. Department of Transportation.

3-1.2 Containers used on the premises in the actual manufacturing or processing need not comply with provisions of 3-1.1.

3-2 Piles.

3-2.1 Containers of ammonium nitrate shall not be accepted for storage when the temperature of the ammonium nitrate exceeds 130°F (54.4°C).

3-2.2 Bags of ammonium nitrate shall not be stored within 30 in. (76 cm) of the storage building walls and partitions.

3-2.3 The height of piles shall not exceed 20 ft (6.1 m). The width of piles shall not exceed 20 ft (6.1 m) nor the length 50 ft (15.2 m) except that, where the building is of noncombustible construction or is protected by automatic sprinklers, the length of piles shall not be limited. In no case shall the ammonium nitrate be stacked closer than 36 in. (0.9 m) below the roof or supporting and spreader beams overhead.

3-2.4 Aisles shall be provided to separate piles by a clear space of not less than 3 ft (0.9 m) in width. At least one service or main aisle in the storage area shall be not less than 4 ft (1.2 m) in width.

3-2.5 The requirements for pile sizes and aisles, as set forth in 3-2.3 and 3-2.4, shall be permitted to be waived by the authority having jurisdiction where storage facilities are located in remote areas.

Chapter 4 Storage of Bulk Ammonium Nitrate

4-1 Structures.

4-1.1 Warehouses shall have adequate ventilation or be capable of adequate ventilation in case of fire.

4-1.2 Unless constructed of noncombustible material or unless adequate facilities for fighting a roof fire are available, bulk storage structures shall not exceed a height of 40 ft (12.2 m).

4-2 Compartments.

4-2.1 Bins shall be clean and free of materials that can contaminate ammonium nitrate.

4-2.2* Due to the corrosive and reactive properties of ammonium nitrate, and to avoid contamination, galvanized iron, copper, lead, and zinc shall not be used in bin

construction unless suitably protected. Aluminum bins, and wooden bins protected against impregnation by ammonium nitrate, are permissible.

4-2.3 The warehouse shall be permitted to be subdivided into any desired number of ammonium nitrate storage compartments or bins. The partitions dividing the ammonium nitrate storage from the storage of other products that would contaminate the ammonium nitrate shall be of tight construction.

4-2.4 The ammonium nitrate storage bins or piles shall be clearly identified by signs reading "AMMONIUM NITRATE" with letters at least 2 in. (5 cm) high.

4-3 Piles.

4-3.1 Piles or bins shall be so sized and arranged that all material in the pile is moved out periodically in order to minimize possible caking of the stored ammonium nitrate.

4-3.2* Height or depth of piles shall be limited by the pressure-setting tendency of the product. However, in no case shall the ammonium nitrate be piled higher at any point than 36 in. (0.9 m) below the roof or supporting and spreader beams overhead.

4-3.3 Ammonium nitrate shall not be accepted for storage when the temperature of the product exceeds 130°F (54.4°C).

4-3.4 Dynamite, other explosives, and blasting agents shall not be used to break up or loosen caked ammonium nitrate.

Chapter 5 Contaminants

5-1 Separation.

5-1.1 Ammonium nitrate shall be in a separate building or shall be separated by approved fire partitions of not less than 1 hour fire endurance from storage of organic chemicals, acids or other corrosive materials, materials that can require blasting during processing or handling, compressed flammable gases, flammable and combustible materials, or other contaminating substances including *but not limited to* animal fats, baled cotton, baled rags, baled scrap paper, bleaching powder, burlap or cotton bags, caustic soda, coal, coke, charcoal, cork, camphor, excelsior, fibers of any kind, fish oils, fish meal, foam rubber, hay, lubricating oil, linseed oil, or other oxidizable or drying oils, naphthalene, oakum, oiled clothing, oiled paper, oiled textiles, paint, straw, sawdust, wood shavings, or vegetable oil. Walls referred to in this section need extend only to the underside of the roof.

5-1.2 In lieu of separation walls, ammonium nitrate shall be permitted to be separated from the materials referred to in 5-1.1 by a space of at least 30 ft (9.1 m) or more as required by the authority having jurisdiction and sills or curbs shall be provided to prevent mixing during fire conditions.

5-1.3 Flammable liquids such as gasoline, kerosene, solvents, and light fuel oils shall not be stored on the premises except where such storage conforms to NFPA 30, *Flammable and Combustible Liquids Code*, and where walls and sills or curbs are provided in accordance with 5-1.1 or 5-1.2.

5-1.4 LP-Gas shall not be stored on the premises except where such storage conforms to NFPA 58, *Standard for the Storage and Handling of Liquefied Petroleum Gases*.

5-2 Prohibited Articles.

5-2.1 Sulfur and finely divided metals shall not be stored in the same building with ammonium nitrate except where such storage conforms to NFPA 495, *Explosive Materials Code*.

5-2.2 Explosives and blasting agents shall not be stored in the same building with ammonium nitrate except on the premises of makers, distributors, and user-compounders of explosives or blasting agents.

5-2.2.1 Where explosives or blasting agents are stored in separate buildings, other than on the premises of makers, distributors, and user-compounders of explosives or blasting agents, they shall be separated from the ammonium nitrate by the distances or barricades specified in the *Table of Recommended Separation Distances of Ammonium Nitrate and Blasting Agents from Explosives or Blasting Agents*, found in NFPA 495, *Explosive Materials Code*.

5-2.2.2 Storage or operations on the premises of makers, distributors, and user-compounders of explosives or blasting agents shall be in conformity with NFPA 495, *Explosive Materials Code*.

Chapter 6 General Precautions

6-1 Electrical Installations.

6-1.1 Electrical installations shall conform to the requirements of NFPA 70, *National Electrical Code*,^{*} for ordinary locations. They shall be designed to minimize damage from corrosion.

6-1.2 Electric lamps shall be located or guarded so as to preclude contact with bags or other combustible materials.

6-2 Housekeeping.

6-2.1 Good housekeeping shall be maintained.

6-2.2 If contents of broken bags are uncontaminated, they shall be permitted to be salvaged by placing the damaged bag inside a clean, new slipover bag and closing securely. Other spilled materials and discarded containers shall be promptly gathered and disposed of in a safe manner.

6-3 Sources of Ignition. Open flames and smoking shall be prohibited in storage buildings, and this is not meant to include heating units approved by the authority having jurisdiction.

6-4 Signs. All points of entry to commercial warehouses in which ammonium nitrate is stored shall be properly identified with durable signs meeting the following specifications:

(a) Signs shall have background and letters in contrasting colors.

(b) Signs shall be worded "AMMONIUM NITRATE," with letters at least 2 in. (5 cm) high.

6-5 Vehicles and Lift Trucks.

6-5.1 Internal combustion motor vehicles, lift trucks, and cargo conveyors shall not be permitted to remain unattended in a building where ammonium nitrate is stored unless parked in an area that will prevent the spreading of a fire in the event of a vehicle fire.

6-5.2* Fork trucks, tractors, platform lift trucks, and other specialized industrial trucks used within the warehouse shall be maintained so that fuels or hydraulic fluids do not contaminate the ammonium nitrate.

6-6* Handling Equipment. Hollow spaces shall be avoided in nitrate handling equipment where nitrate could collect and be confined under sufficiently high pressure to become a source of explosion in the event of fire.

6-7 Lightning. In areas where lightning storms are prevalent, lightning protection shall be provided. (See NFPA 780, *Lightning Protection Code*.)

6-8 Control of Access. Provisions shall be made to prevent unauthorized personnel from entering the ammonium nitrate storage area.

Chapter 7 Fire Protection

7-1 Automatic Sprinklers.

7-1.1 Unless the storage of a greater quantity is approved by the authority having jurisdiction, not more than 2,500 tons (2,268 metric tons) of bagged ammonium nitrate shall be stored in a building or structure not equipped with an automatic sprinkler system.

7-1.2 When determining whether greater quantities shall be permitted without sprinkler protection, the authority having jurisdiction shall take into consideration exposure of the storage building to built-up areas and possible presence of contaminants in the storage building.

7-1.3 Sprinkler protection shall be permitted to be required for the storage of less than 2,500 tons (2,268 metric tons) of ammonium nitrate where location of the building or the presence of other stored materials can present a special hazard.

7-1.4 Sprinkler systems shall be of approved type and installed in accordance with NFPA 13, *Standard for the Installation of Sprinkler Systems*.

7-2 Extinguishing Devices.

7-2.1 Suitable fire control devices such as small hose or portable extinguishers shall be provided throughout the warehouse and in the loading and unloading areas. (See NFPA 10, *Standard for Portable Fire Extinguishers*, and NFPA 14, *Standard for the Installation of Standpipe and Hose Systems*.)

7-2.2 Water supplies and fire hydrants shall be available in accordance with recognized good practices and as required by the authority having jurisdiction. (See NFPA 24, *Standard for the Installation of Private Fire Service Mains and Their Appurtenances*.)

7-2.3 The requirements for automatic sprinklers, water supplies, and fire hydrants set forth in 7-1.4 and 7-2.2 shall be permitted to be waived by the authority having jurisdiction where storage facilities are located in remote areas.

Chapter 8 Referenced Publications

8-1 The following documents or portions thereof are referenced within this code and shall be considered part of the requirements of this document. The edition indicated for each reference is the current edition as of the date of the NFPA issuance of this document.

8-1.1 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101.

NFPA 13, *Standard for the Installation of Sprinkler Systems*, 1991 edition

NFPA 30, *Flammable and Combustible Liquids Code*, 1990 edition

NFPA 58, *Standard for the Storage and Handling of Liquefied Petroleum Gases*, 1992 edition

NFPA 70, *National Electrical Code*, 1993 edition

NFPA 203, *Guideline on Roof Coverings and Roof Deck Constructions*, 1992 edition

NFPA 220, *Standard on Types of Building Construction*, 1992 edition

NFPA 495, *Explosive Materials Code*, 1992 edition

8-1.2 Other Publications.

Definitions and Test Procedures for Ammonium Nitrate Fertilizer, Washington, DC, Fertilizer Institute, 1984

Standard for Ammonium Nitrate (Nitrous Oxide Grade), Arlington, VA, Compressed Gas Assn.

Appendix A Explanatory Notes

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

A-2-2.4 Ammonium nitrate is capable of undergoing detonation with the blast effect of about half the quantity of explosives, if heated under confinement that permits high pressure build-up or if subjected to strong shocks, such as

those from an explosive. The sensitivity of ammonium nitrate to detonation is increased by elevated temperatures or by contamination. (See Chapter 5.)

A-4-2.2 Steel or wood can be protected by special coatings such as sodium silicate, or epoxy coatings, or polyvinyl chloride coatings.

A-4-3.2 Pressure setting is a factor affected by humidity and temperature in the storage space and by pellet quality. Temperature cycles through 90°F (32°C) and high atmospheric humidity are undesirable for storage in depth.

A-6-5.2 It is recommended that electric or LP-Gas powered trucks be employed rather than gasoline or diesel to reduce the potential for contamination to ammonium nitrate.

A-6-6 Examples of hollow spaces include hollow conveyor rollers and hollow screw conveyor shafts.

Appendix B Suggested Fire Fighting Procedure

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

B-1 Should a fire break out in an area where ammonium nitrate is stored, it is important that the mass be kept cool and the burning be promptly extinguished. Apply large volumes of water as quickly as possible. If fires reach massive and uncontrollable proportions, fire fighting personnel should evacuate the area and withdraw to a safe place.

B-2 Provide as much ventilation as possible to the fire area. Rapid dissipation of both the products of decomposition and the heat of reaction is very important.

B-3 Approach the fire from upwind as the vapors from burning ammonium nitrate are very toxic. Self-contained breathing apparatus of types approved by the U.S. Bureau of Mines should be used to protect personnel against gases.

B-4 After extinguishment of the fire, the loose and contaminated unsalvageable ammonium nitrate should be buried or dumped in water, where permissible. Any residue that cannot be removed by sweeping should be washed away with hoses. Flushing and scrubbing of all areas should be very thorough to ensure the dissolving of all residue. Wet empty bags should be removed, permitted to dry out, and then burned out of doors.

Appendix C Suggested Provisions for Municipal Legal Regulations

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

NOTE: Where this code is used as the basis for municipal legal regulations, the following provisions are suggested as an aid to enforcement.

C-1 Title. This ordinance shall be known as “an ordinance regulating the storage, having, and keeping of ammonium nitrate in the City of” and shall be permitted to be referred to as “The Ammonium Nitrate Storage Ordinance.”

NOTE: The title should conform with local law and practice.

C-2 Definitions.

C-2.1 Chief. The Chief of the Fire Department or his or her authorized representative is hereby designated as “the authority having jurisdiction” wherever that expression appears in the ordinance.

C-2.2 Jurisdiction. “Jurisdiction” wherever used in this ordinance shall mean the City of

C-2.3 Permit. The term “Permit,” wherever used in this ordinance, shall mean the written authority of the issued pursuant to this ordinance to store, have, or keep pure, fertilizer, or other grades of ammonium nitrate and mixtures containing 60 percent or more by weight of ammonium nitrate and that are classified as oxidizing materials (usually by the Department of Transportation) by the authority having jurisdiction.

C-3 Application. This ordinance shall apply to all persons, firms, corporations, co-partnerships, governmental agencies except federal, and associations storing, having, or keeping ammonium nitrate and to the owner or lessee of any building or premises in or on which ammonium nitrate is stored or kept.

C-4 Permitted Locations.

C-4.1 The storage of ammonium nitrate in quantities of 1,000 lb (454 kg) or more is prohibited within the following limits:

NOTE: These limits are to be specified according to local zoning ordinances. They should include all residential, mercantile, and other congested districts.

C-4.2 No permit shall be issued until approval has been given for the proposed storage location with respect to nearness to places of public assembly, schools, hospitals and churches, and adequacy of water supply for fire control.

C-5 Retroactivity. The chief may issue a permit for the continued use of an existing warehouse, storage facility, handling equipment, building, and structure for the storage of ammonium nitrate that is not in strict compliance with the terms of this ordinance in cases in which continued use will not constitute a distinct hazard to life or adjoining property. In cases where such permit is denied, the chief shall notify the applicant and specify the reasons for denial in writing.

C-6 Permits.

C-6.1 A permit issued pursuant to this ordinance shall be obtained from the chief to store, have, or keep, in quantities of 1,000 lb (454 kg) or more, pure, fertilizer, and other grades of ammonium nitrate, and mixtures containing 60 percent or more by weight of ammonium nitrate and that are

classified as oxidizing materials (usually by the Department of Transportation) by the authority having jurisdiction.

C-6.2 Permits shall not be transferable.

C-6.3 Each permit granted by the chief shall be valid for such period as may be specified but not to exceed one year, shall be a revocable license, and shall expire when revoked.

C-7 Inspection and Approval.

C-7.1 Application for a permit to use or operate facilities for the storage, having, or keeping of ammonium nitrate as herein required shall be made in writing to the chief. The chief shall then cause to be made an inspection of the premises and equipment proposed to be used. If they are found to be in compliance with this ordinance, a statement to that effect shall be noted on the application and the application signed by the person making the inspection. The chief shall thereupon issue a permit as applied for.

C-7.2 The chief may at any reasonable time inspect premises, buildings, installations, or equipment for the storage and handling of ammonium nitrate. If a violation of this ordinance is found to exist, the chief shall file with the owner, occupant, or operator a notice citing the violation and ordering its correction. If such order is not complied with, the chief may suspend the permit issued for such facility.

C-7.3 In the event that an inspection reveals a violation of this ordinance serious enough in the chief's opinion to constitute a clear and present danger to the public safety, the chief shall take whatever measures are necessary to correct, abate, or remove the hazard or condition.

C-8 Modification. The chief shall have the power to grant exemption from application of the ordinance upon request in writing to do so when such request shows that the enforcement of the ordinance will cause unnecessary hardship to the petitioner, provided that said request shall not be granted where the requested use will constitute a distinct hazard to life or adjoining property. The particulars of such exemptions when granted shall be entered upon the permit issued. A copy thereof shall be retained by the chief.

C-9 Appeals.

C-9.1 An owner, lessee, agent, operator, or occupant aggrieved by any order issued pursuant to this ordinance may file an appeal to the City Council within ten days from the service of such an order, and the City Council shall fix a time and place not less than five days nor more than ten days thereafter when and where such appeal may be heard by it. Such appeal shall stay the execution of such order until it has been heard and reviewed, vacated, or confirmed. Nothing in this section shall be construed as preventing the chief from taking any action indicated by Section B-7-3 of this ordinance.

NOTE: This section should conform to local law and practice with respect to terminology and designation of agency to hear appeals.

C-9.2 The City Council shall at such hearing affirm, modify, revoke, or vacate such order. Unless revoked or vacated, such order shall then be complied with.

C-9.3 Nothing therein contained shall be deemed to deny the right of any person, firm, corporation, co-partnership, or voluntary association to appeal from an order or decision of the City Council to a court of competent jurisdiction. Such appeal shall stay the execution of such order until it has been heard and reviewed, vacated, or confirmed.

C-10 Penalties. Any person who shall violate any of the provisions of this ordinance or fail to comply therewith, or who shall violate or fail to comply with any order made thereunder, or who shall build in violation of any detailed statement of specifications or plans submitted and approved thereunder, or any certificate or permit issued thereunder, and from which no appeal has been taken, or who shall fail to comply with such an order as affirmed or modified by the City Council or by a court of competent jurisdiction, within the time fixed herein shall severally for each and every violation and non-compliance, respectively, be guilty of a misdemeanor, punishable by a fine of not less than \$ or by imprisonment for not less than days nor more than days or by both such fine and imprisonment. The imposition of one penalty for any violation shall not excuse the violation or permit it to continue; and all such persons shall be required to correct or remedy such violations or defects within a reasonable time; and when not otherwise specified, each ten days that prohibited conditions are maintained shall constitute a separate offense. The application of the foregoing penalty shall not be held to prevent the enforced removal of prohibited conditions.

C-11 Repeal of Conflicting Ordinances. All former ordinances or parts thereof conflicting with the provisions of this ordinance are hereby repealed.

C-12 Severability. The City Council hereby declares that, should any section, paragraph, sentence, or word of this ordinance be declared, for any reason, to be invalid, it is the intent of said City Council that it would have passed all other portions of this ordinance independent of the elimination herefrom of any such portion as may be declared invalid.

C-13 Effective Date. This ordinance shall take effect upon of

Appendix D Referenced Publications

D-1 The following documents or portions thereof are referenced within this code for informational purposes only and thus should not be considered part of the requirements of this document. The edition indicated for each reference is the current edition as of the date of the NFPA issuance of this document.

D-1.1 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101.

NFPA 10, *Standard for Portable Fire Extinguishers*, 1990 edition

NFPA 14, *Standard for the Installation of Standpipe and Hose Systems*, 1993 edition

NFPA 24, *Standard for the Installation of Private Fire Service Mains and Their Appurtenances*, 1992 edition

NFPA 780, *Lightning Protection Code*, 1992 edition

D-1.2 Other Publications.

D-1.2.1 U.S. Government Publications. U.S. Bureau of Mines, Pittsburgh Mining and Safety Research Center, 4800 Forbes Ave., Pittsburgh, PA 15213.

Report of Investigations 6746, *Sympathetic Detonation of Ammonium Nitrate and Ammonium Nitrate-Fuel Oil*, 1966

Report of Investigations 6773, *Explosion Hazards of Ammonium Nitrate Under Fire Exposure*, 1966

Report of Investigations 6903, *Further Studies on Sympathetic Detonation*, 1966

Index

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-A-

Access, control of 6-8

Aisles 3-2.4, 3-2.5

Appeals C-9

Application of code 2-1

-B-

Bags, storage in Chap. 3

Bins, bulk storage 4-2, A-4-2.2

Blasting agents, storage prohibition 5-2.2

Buildings, storage 2-3

Bulk storage see Storage, Bulk

-C-

Compartments, bulk storage 4-2, A-4-2.2

Containers, storage in 3-1

Contaminants Chap. 5

-D-

Detonation A-2-2.4

Drums, storage in Chap. 3

-E-

Electrical installations 6-1

Explosives, storage prohibitions 5-2.2

Extinguishing devices 7-2

-
- F-**
Fire fighting procedure, suggested App. B
Fire protection Chap. 7
Flammable liquids 5-1.3
- G-**
General precautions Chap. 6
General provisions Chap. 2
- H-**
Handling equipment 6-6, A-6-6
Housekeeping 6-2
- I-**
Ignition sources 6-3
Inspection C-7
- L-**
Legal regulations, municipal, suggested provisions App. C
Lightning protection 6-7
Locations
 Permitted C-4
 Restricted 2-2, A-2-2.4
- M-**
Metals, finely divided, storage prohibition 5-2.1
- P-**
Penalties C-10
Permits 2-2.1, C-4.2, C-6
 Definition C-2.3
 Retroactivity C-5
- Piles**
 Bulk storage 4-3, A-4-3.2
 Containers, bags, etc. 3-2
Prohibited storage 5-2
Purpose of code 1-2
- R-**
Restricted locations 2-2, A-2-2.4
- S-**
Scope of code 1-1
Separation from contaminants or materials 5-1
Signs 6-4
Sprinklers, automatic 7-1
Storage
 Bulk Chap. 4
 Container Chap. 3
 Large quantities 2-2.4, A-2-2.4
 Piles 3-2, 4-3
 Prohibited articles 5-2
Storage buildings see Buildings, storage
Structures 2-3
 Bulk storage Chap. 4
Sulfur, prohibition in storage 5-2.1
- T-**
Trucks, lift and other industrial 6-5, A-6-5.2
- V-**
Vehicles 6-5, A-6-5.2

The NFPA Codes and Standards Development Process

Since 1896, one of the primary purposes of the NFPA has been to develop and update the standards covering all areas of fire safety.

Calls for Proposals

The code adoption process takes place twice each year and begins with a call for proposals from the public to amend existing codes and standards or to develop the content of new fire safety documents.

Report on Proposals

Upon receipt of public proposals, the technical committee members meet to review, consider, and act on the proposals. The public proposals – together with the committee action on each proposal and committee-generated proposals – are published in the NFPA's Report on Proposals (ROP). The ROP is then subject to public review and comment.

Report on Comments

These public comments are considered and acted upon by the appropriate technical committees. All public comments – together with the committee action on each comment – are published as the Committee's supplementary report in the NFPA's Report on Comments (ROC).

The committee's report and supplementary report are then presented for adoption and open debate at either of NFPA's semi-annual meetings held throughout the United States and Canada.

Association Action

The Association meeting may, subject to review and issuance by the NFPA Standards Council, (a) adopt a report as published, (b) adopt a report as amended, contingent upon subsequent approval by the committee, (c) return a report to committee for further study, and (d) return a portion of a report to committee.

Standards Council Action

The Standards Council will make a judgement on whether or not to issue an NFPA document based upon the entire record before the Council, including the vote taken at the Association meeting on the technical committee's report.

Voting Procedures

Voting at an NFPA Annual or Fall Meeting is restricted to members of record for 180 days prior to the opening of the first general session of the meeting, except that individuals who join the Association at an Annual or Fall Meeting are entitled to vote at the next Fall or Annual Meeting.

"Members" are defined by Article 3.2 of the Bylaws as individuals, firms, corporations, trade or professional associations, institutes, fire departments, fire brigades, and other public or private agencies desiring to advance the purposes of the Association. Each member shall have one vote in the affairs of the Association. Under Article 4.5 of the Bylaws, the vote of such a member shall be cast by that member individually or by an employee designated in writing by the member of record who has registered for the meeting. Such a designated person shall not be eligible to represent more than one voting privilege on each issue, nor cast more than one vote on each issue.

Any member who wishes to designate an employee to cast that member's vote at an Association meeting in place of that member must provide that employee with written authorization to represent the member at the meeting. The authorization must be on company letterhead signed by the member of record, with the membership number indicated, and the authorization must be recorded with the President of NFPA or his designee before the start of the opening general session of the Meeting. That employee, irrespective of his or her own personal membership status, shall be privileged to cast only one vote on each issue before the Association.

Sequence of Events Leading to Publication of an NFPA Committee Document

Call for proposals to amend existing document or for recommendations on new document.



Committee meets to act on proposals, to develop its own proposals, and to prepare its report.



Committee votes on proposals by letter ballot. If two-thirds approve, report goes forward.
Lacking two-thirds approval, report returns to committee.



Report is published for public review and comment. (Report on Proposals - ROP)



Committee meets to act on each public comment received.



Committee votes on comments by letter ballot. If two-thirds approve, supplementary report goes forward. Lacking two-thirds approval, supplementary report returns to committee.



Supplementary report is published for public review. (Report on Comments - ROC).



NFPA membership meets (Annual or Fall Meeting) and acts on committee report (ROP and ROC).



Committee votes on any amendments to report approved at NFPA Annual or Fall Meeting.



Complaints to Standards Council on Association action must be filed
within 20 days of the NFPA Annual or Fall Meeting.



Standards Council decides, based on all evidence, whether or not to issue standard
or to take other action, including hearing any complaints.



Appeals to Board of Directors on Standards Council action must be filed
within 20 days of Council action.

FORM FOR PROPOSALS ON NFPA TECHNICAL COMMITTEE DOCUMENTS

Mail to: Secretary, Standards Council

National Fire Protection Association, 1 Batterymarch Park, Quincy, Massachusetts 02269-9101

Fax No. 617-770-3500

Note: All proposals must be received by 5:00 p.m. EST/EDST on the published proposal-closing date.

If you need further information on the standards-making process, please contact the
Standards Administration Department at 617-984-7249.

Date 9/18/93 Name John B. Smith Tel. No. 617-555-1212

Company _____

Street Address 9 Seattle St., Seattle, WA 02255

Please Indicate Organization Represented (if any) Fire Marshals Assn. of North America

1. a) NFPA Document Title National Fire Alarm Code NFPA No. & Year NFPA 72, 1993 ed.

b) Section/Paragraph 1-5.8.1 (Exception No.1)

2. Proposal recommends: (Check one) ☐ new text
☐ revised text
☒ deleted text

FOR OFFICE USE ONLY

Log # _____

Date Rec'd _____

3. Proposal (include proposed new or revised wording, or identification of wording to be deleted):

Delete exception.

4. **Statement of Problem and Substantiation for Proposal:** (Note: State the problem that will be resolved by your recommendation; give the specific reason for your proposal including copies of tests, research papers, fire experience, etc. If more than 200 words, it may be abstracted for publication.)

A properly installed and maintained system should be free of ground faults. The occurrence of one or more ground faults should be required to cause a "trouble" signal because it indicates a condition that could contribute to future malfunction of the system. Ground fault protection has been widely available on these systems for years and its cost is negligible. Requiring it on all systems will promote better installations, maintenance and reliability.

5. ☒ **This Proposal is original material.** (Note: Original material is considered to be the submitter's own idea based on or as a result of his/her own experience, thought, or research and, to the best of his/her knowledge, is not copied from another source.)

☐ **This Proposal is not original material; its source (if known) is as follows:** _____

Note 1: Type or print legibly in black ink.

Note 2: If supplementary material (photographs, diagrams, reports, etc.) is included, you may be required to submit sufficient copies for all members and alternates of the technical committee.

I hereby grant NFPA the non-exclusive, royalty-free rights, including non-exclusive, royalty-free rights in copyright, in this proposal and I understand that I acquire no rights in any publication of NFPA in which this proposal in this or another similar or analogous form is used.

John B. Smith
Signature (Required)

FORM FOR PROPOSALS ON NFPA TECHNICAL COMMITTEE DOCUMENTS

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Date _____ Name _____ Tel. No. _____

Company _____

Street Address _____

Please Indicate Organization Represented (if any) _____

1. a) NFPA Document Title _____ NFPA No. & Year _____

b) Section/Paragraph _____

2. Proposal Recommends: (Check one) ☐ new text
☐ revised text
☐ deleted text

FOR OFFICE USE ONLY

Log # _____

Date Rec'd _____

3. Proposal (include proposed new or revised wording, or identification of wording to be deleted):

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Signature (Required)

PLEASE USE SEPARATE FORM FOR EACH PROPOSAL

Cut here