

NFPA 17A

Standard for Wet Chemical Extinguishing Systems 1994 Edition



Errata

NFPA 17A

Wet Chemical Extinguishing Systems

1994 Edition

Reference: 5-1.1

The Committee on Dry and Wet Chemical Extinguishing Systems notes the following error in the 1994 edition of NFPA 17A, *Standard for Wet Chemical Extinguishing Systems*:

1. Revise Paragraph 5-1.1 to read:

5-1.1* A trained person who has undergone the instructions necessary to perform the maintenance and recharge service reliably and has the applicable manufacturer's installation and maintenance manual and service bulletins shall service the wet chemical fire extinguishing system at intervals not more than 6 months apart as outlined in Section 3-3.

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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 17A

Standard for

Wet Chemical Extinguishing Systems

1994 Edition

This edition of NFPA 17A, *Standard for Wet Chemical Extinguishing Systems*, was prepared by the Technical Committee on Dry and Wet Chemical Extinguishing Systems and acted on by the National Fire Protection Association, Inc., at its Annual Meeting held May 16-18, 1994, in San Francisco, CA. It was issued by the Standards Council on July 14, 1994, with an effective date of August 5, 1994, and supersedes all previous editions.

The 1994 edition of this document has been approved by the American National Standards Institute.

Origin and Development of NFPA 17A

The Dry Chemical Extinguishing Systems Committee was activated in 1952. On April 6, 1983, the Standards Council received a request to assign the subject of wet chemical extinguishing systems to the appropriate committee. Listed systems had been available for some time. After the Foam Committee declined the request, the Dry Chemical Committee was asked to assume responsibility for the project. In May 1983, the Dry Chemical Extinguishing Systems Committee voted to accept the assignment and requested that the Standards Council expand the Committee Scope to include the new topic. The Committee also requested that the new document be identified as NFPA 17A, *Standard for Wet Chemical Extinguishing Systems*. A subcommittee met in June 1983 to develop the text. In November 1984, the Council approved a request to change the name of the Committee to the Committee on Dry and Wet Chemical Extinguishing Systems. The 1990 edition was a partial revision of the 1986 edition.

The standard was rewritten for this edition to more clearly state the requirements and to separate the mandatory from the nonmandatory requirements to assist in making the document more usable, enforceable, and adoptable.

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This list represents the membership at the time the Committee was balloted on the text of this edition. Since that time, changes in the membership may have occurred.

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: This Committee shall have primary responsibility for documents on the design, installation, operation, testing, maintenance, and use of dry and wet chemical extinguishing systems for fire protection.

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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 Chapter 6 and Appendix B.

Chapter 1 General

1-1* Scope.

1-1.1 The provisions of this standard apply to the design, installation, operation, testing, and maintenance of pre-engineered, wet chemical fire extinguishing systems that discharge wet chemical from fixed nozzles and piping by means of expellant gas. Minimum requirements are specified for restaurant, commercial, and institutional hoods, plenums, ducts, and associated cooking appliances.

1-2 Purpose. This standard is prepared for the use and guidance of those charged with the purchasing, designing, installing, testing, inspecting, approving, listing, operating, or maintaining of wet chemical, pre-engineered fire extinguishing systems in order that such equipment will function as intended throughout its life. Nothing in this standard is intended to prevent the use of new methods or devices, provided sufficient technical data are submitted to the authority having jurisdiction to demonstrate that the new method or device is equivalent in quality, effectiveness, durability, and safety to that prescribed by this standard.

1-2.1 Only persons properly trained shall be considered competent to design, install, and service pre-engineered, wet chemical systems. It might be necessary for many of those charged with the purchasing, inspecting, testing, approving, operating, and maintaining of this equipment to consult an experienced fire protection engineer, competent in this field, in order to discharge their respective duties effectively.

1-3 Retroactivity Clauses. The provisions of this document are considered necessary to provide a reasonable level of protection from loss of life and property from fire. They reflect situations and the state of the art at the time the standard was issued.

Unless otherwise noted, it is not intended that the provisions of this document be applied to facilities, equipment, structures, or installations that were existing or approved for construction or installation prior to the effective date of this document.

Exception: In those cases where it is determined by the authority having jurisdiction that the existing situation involves a distinct hazard to life or property, this standard shall apply.

1-4 Definitions.

1-4.1 For the purpose of clarification, the following general terms used with special technical meanings in this standard are defined.

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, procedures, equipment, or materials, the 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 that is in a position to determine compliance with appropriate standards for the current production of listed items.

Authority Having Jurisdiction. 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, or 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 or her 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.

Automatic Operation. Operation that does not require any human action.

Auxiliary Equipment. Listed equipment used in conjunction with the wet chemical systems, e.g., to shut down power, fuel, or ventilation to the hazard being protected or to initiate signaling devices.

Branch Duct. The duct work that contains the exhaust air from a single hood or hazard area.

Common Duct. The duct work containing the exhaust air from two or more branch ducts.

DOT. The U.S. Department of Transportation, which has jurisdiction over the design and transportation of compressed gas cylinders and cartridges.

Expellant Gas. The medium used to discharge the wet chemical solution from its container.

Inspection. Inspection is a "quick check" to give reasonable assurance that the extinguishing system is fully charged and operable. This is done by seeing that the system is in place, that it has not been activated or tampered with, and that there is no obvious physical damage or condition to prevent operation.

Inspection and Maintenance Manual. A pamphlet containing the manufacturer's requirements for the proper design, installation, operation, recharge, inspection, and maintenance of the extinguishing system.

Liquid Agent. (See *Wet Chemical*.)

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.

Maintenance. Maintenance is a thorough check to give maximum assurance that the extinguishing system will operate as intended. It includes a thorough examination and any necessary repair or replacement of system components.

Manual Operation. Operation of a system requiring human action.

Owner's Manual. A pamphlet containing the manufacturer's recommendations for the proper inspection of the extinguishing system.

Pipe. Circular conduit for conveying the wet chemical to the discharge nozzle(s). Wherever the term "pipe" is used in this standard, it shall be understood also to mean "tube."

Pre-engineered Systems. Those having predetermined flow rates, nozzle pressures, and quantities of liquid agent. These systems have the specific pipe size, maximum and minimum pipe lengths, flexible hose specifications, number of fittings, and number and types of nozzles prescribed by a testing laboratory. The maximum and minimum pipe lengths and the number of fittings may be expressed in equivalent feet of pipe. The hazards protected by these systems are specifically limited as to type and size by a testing laboratory, based upon actual fire tests. Limitations on hazards that can be protected by these systems and piping and nozzle configurations are contained in the manufacturer's listed installation and maintenance manual, which is part of the listing.

Recharge. The replacement of the wet chemical and expellant gas.

Shall. Indicates a mandatory requirement.

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

TC. Transport Canada, which has jurisdiction over design and transportation of compressed gas cylinders and cartridges.

Trained. One who has undergone the instructions necessary to safely design and install and reliably perform the maintenance and recharge service.

Wet Agent. (See *Wet Chemical*.)

Wet Chemical. Normally a solution of water and potassium carbonate-based chemical, potassium acetate-based chemical, or a combination thereof that forms an extinguishing agent.

NOTE: The terms "liquid agent" and "wet agent" are used interchangeably with "wet chemical."

1-5 Units.

1-5.1 Metric units of measurement in this standard are in accordance with the modernized metric system known as the International System of Units (SI). (See *ASTM E380, Standard for Metric Practice*.)

1-5.2 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.

1-5.3 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 2 Components

2-1 General. Only system components referenced or permitted in the manufacturer's listed installation and maintenance manual or alternate components that are listed for use with the specific extinguishing system shall be used.

2-2 Detectors.

2-2.1 Detectors shall be a listed or approved device that is capable of detecting heat.

2-3 Discharge Nozzles. (See Section 3-6.)

2-3.1 Discharge Nozzles. Discharge nozzles shall be listed for their intended use.

2-3.1.1 Discharge nozzles shall be provided with an internal strainer or a separate listed strainer located immediately upstream of the nozzle.

2-3.1.2 Discharge nozzles shall be of brass, stainless steel, or other corrosion-resistant materials, or be protected inside and out against corrosion. They shall be made of noncombustible materials and shall withstand the expected fire exposure without deformation.

2-3.1.3* Discharge nozzles shall be permanently marked for identification.

2-3.1.4 All discharge nozzles shall be provided with caps or other suitable devices to prevent the entrance of grease vapors, moisture, or other foreign materials into the piping. The protection device shall blow off, open, or blow out upon agent discharge.

2-4 Operating Devices.

2-4.1 Operating devices shall be listed and include releasing mechanisms, alarms, manual actuators, shutoff, and auxiliary equipment.

2-4.1.1 Operation shall be by listed mechanical, electrical, or pneumatic means.

2-4.1.2 Operating devices shall be designed for the service they will encounter and shall not be rendered inoperative or susceptible to accidental operation.

2-4.1.3 Operating devices shall be designed to function properly through a minimum temperature range from 32°F to 120°F (0°C to 49°C) or marked to indicate their temperature limitations.

2-4.1.3.1 Manual actuators shall not require a force of more than 40 lb (178 N) nor a movement of more than 14 in. (35.6 cm) to effect operation.

2-4.1.3.2 All remote manual operating devices shall be identified as to the hazard they protect.

2-4.1.3.3 All manual actuators shall be provided with operating instructions. The instructions shall be permitted to include the use of pictographs and shall have lettering at least 1/4 in. (6.35 mm) in height. (See 3-2.1.3.)

2-4.2 Shutoff Devices.

2-4.2.1 All shutoff devices shall function with the system operation.

NOTE: Exhaust fans and dampers do not need to be shut down upon system actuation. The systems have been tested under both zero and high-velocity flow conditions.

2-4.2.1.1 If the expellant gas is used to pneumatically operate these devices, the gas shall be taken prior to its entry into the wet chemical tank.

2-4.2.2 Wet chemical extinguishing systems shall be provided with an automatic means to ensure the shutoff of fuel or power to the protected appliances, and other appliances located under ventilating equipment protected by the extinguishing system, upon system actuation.

2-4.2.3 Shutoff devices shall require manual resetting prior to fuel or power being restored.

2-5 Pipe and Fittings.

2-5.1* General. Pipe and fittings shall be of noncombustible material having physical and chemical characteristics compatible with the wet chemical solution. Galvanized pipe and fittings shall not be used. The pressure rating of the pipe fittings and connection joints shall withstand the maximum expected pressure in the piping system. Pipe, tubing, and fitting materials and types shall be in accordance with the manufacturer's listed installation and maintenance manual.

2-6 Wet Chemical.

2-6.1* The type of wet chemical used in the system shall be listed for the particular system and recommended by the manufacturer of the wet chemical system.

CAUTION: Wet chemical solutions of different formulations or different manufacturers shall not be mixed.

2-7 Electrical Wiring and Equipment.

2-7.1 Electrical wiring and equipment shall be installed in accordance with NFPA 70, *National Electrical Code*®, or the requirements of the authority having jurisdiction.

CAUTION: Wet chemical, when discharged, is in the form of a fine spray. Some of the agent may settle on surrounding surfaces and could have a corrosive effect on electrical components and cooking equipment. Prompt cleanup will minimize staining or corrosion.

Chapter 3 System Requirements

3-1 General.

3-1.1 Use. Hazards and equipment that can be protected using wet chemical extinguishing systems include restaurant, commercial, and institutional hoods, plenums, ducts, and associated cooking appliances.

3-1.2 Applications. See the manufacturer's listed installation and maintenance manual for system limitations and applications for which wet chemical extinguishing systems shall be considered satisfactory protection.

3-1.3 Each protected cooking appliance, individual hood, and branch exhaust duct directly connected to the hood shall be protected by a system or systems designed for simultaneous operation.

3-1.4 Where two or more hazards may be simultaneously involved in fire by reason of their proximity, the hazards shall be protected by individual systems installed to operate simultaneously, or by a single system designed to protect all hazards that may be simultaneously involved. Any hazard that will allow fire propagation from one area to another shall constitute a single fire hazard.

3-2 System Actuation.

3-2.1 All systems shall have both automatic and manual methods of actuation.

3-2.1.1 Automatic detection and system actuation shall be in accordance with the manufacturer's listed installation and maintenance manual.

3-2.1.2 All operating devices shall function simultaneously with system operation.

3-2.1.3 Operation of any manual actuator shall be all that is required to bring about the full operation of the system. At least one manual actuator shall be provided for each system.

3-2.1.4 All operating devices shall be designed, located, installed, or protected so that they are not subject to mechanical, environmental, or other conditions that could render them inoperative or cause inadvertent operation of the system.

3-2.1.5 An alarm or indicator shall be provided to show that the system has operated, that personnel response might be needed, and that the system is in need of recharge. The extinguishing system shall be connected to the alarm system, if provided, in accordance with the requirements of NFPA 72, *National Fire Alarm Code*, so that the actuation of the extinguishing system will sound the fire alarm as well as provide the function of the extinguishing system.

3-2.1.6* At least one manual actuator shall be located no more than 5 ft (1.5 m) above the floor and be convenient and easily accessible at all times, including the time of fire.

Exception: Automatic systems protecting common exhaust ducts only shall not require a remote manual actuator.

3-3 Supervision.

3-3.1 Where supervision of any or all of the following is provided, it shall be designed to give an indication of trouble in:

- (a) The automatic detection system.
- (b) The electrical actuation circuit.
- (c) The electrical power supply.

3-3.2 Alarms indicating the failure of supervised devices or equipment shall give prompt and positive indication of any failure and shall be distinctive from alarms indicating operation or hazardous conditions.

3-4* System Location.

3-4.1 Wet chemical containers and expellant gas assemblies shall be located within the temperature range in the listed manufacturer's installation and maintenance manual. If ambient temperatures outside the manufacturer's operating temperature range are expected, protection shall be provided to maintain the temperature within the listed range.

3-4.2 Wet chemical containers and expellant gas assemblies shall not be located where they could be subjected to mechanical, chemical, or other damage. Where damage due to chemical or mechanical exposure is expected, protective devices such as enclosures or guards acceptable to the authority having jurisdiction shall be provided.

3-4.3 Wet chemical containers and expellant gas assemblies shall be accessible for inspection, maintenance, and recharge.

3-4.4 Wet chemical containers and expellant gas assemblies shall be located near the hazard or hazards protected but not where they will be exposed to the fire.

3-5 Discharge Nozzles. (See Section 2-3.)

3-5.1 All discharge nozzles shall be designed and subsequently located, installed, or protected so that they are not subject to mechanical, environmental, or other conditions that could render them inoperative.

3-5.2 Discharge nozzles shall be so connected and supported that they will not be readily put out of alignment.

3-6 Special Requirements.

3-6.1 Systems protecting two or more hoods or plenums, or both, that meet the requirements of 3-1.4 shall be installed to ensure the simultaneous operation of all systems protecting the hoods, plenums, and associated cooking appliances located below the hoods.

3-6.1.1 The building owner(s) shall be responsible for the protection of a common exhaust duct(s) used by more than one tenant.

The tenant shall be responsible for the protection of common exhaust duct(s) serving hoods located within the tenant's space and up to the point of connection to the building owner's common exhaust duct. The tenant's common duct shall be considered a branch duct to the building owner's common duct.

3-6.1.2 A fusible link or heat detector shall be provided above each cooking appliance or group of appliances protected by a single nozzle.

Exception: Cooking appliances located directly below an exhaust duct having a fusible link or heat detector installed at or within 12 in. (305 mm) of the entrance to the duct.

3-6.1.3 Where the pipe penetrates a duct or hood, the penetration shall have a liquid-tight continuous external weld or shall be sealed by a listed device.

3-6.2* Automatic protection shall be provided for all portions of a common exhaust duct. This shall be accomplished by one of the following methods:

(a)* Simultaneous operation of all cooking appliance, hood, and branch duct systems, one or more of which also protect the common exhaust duct. [See Figure A-3-6.2(a).]

Upon operation of these systems, fuel or power to all protected cooking appliances served by the common exhaust duct shall be shut off.

(b)* Simultaneous operation of all systems that protect only the common exhaust duct. [See Figure A-3-6.2(b).]

Upon operation of the common exhaust duct systems, the fuel or power to all protected cooking appliances served by the common exhaust duct shall be shut off.

(c)* Independent operation of systems protecting only the common exhaust duct; each system shall protect a portion of the common exhaust duct so that the entire common exhaust duct is protected [see Figure A-3-6.2(c)]. Each common exhaust duct system shall protect the entire downstream common exhaust duct.

Upon operation of any common duct system, fuel or power to all protected cooking appliances served by that portion of the common exhaust duct shall be shut off.

(d)* Independent operation of cooking appliance, hood, and branch duct systems where one of these systems protects the entire common exhaust duct. [See Figure A-3-6.2(d).]

Upon operation of the cooking appliance, hood, and branch duct system that also protects the common exhaust duct, the fuel or power to all protected cooking appliances served by the common exhaust duct shall be shut off.

Upon operation of any system not protecting the common exhaust duct, only the cooking appliances protected by that system shall be shut off, provided these systems have sufficient fire hazard separation so that simultaneous operation of an additional system or systems shall not be required.

(e)* Independent operation of cooking appliance, hood, and branch duct systems, with two or more of these systems also protecting the common exhaust duct. [See Figure A-3-6.2(e).]

Upon operation of a cooking appliance, hood, and branch duct system that protects a portion of the common exhaust duct, the fuel or power to all protected cooking appliances served by that portion of the common exhaust duct shall be shut off.

Each common exhaust duct system shall provide protection for the largest common exhaust duct downstream of each system.

Upon operation of a cooking appliance, hood, and branch duct system that does not protect a portion of the common exhaust duct, only the fuel or power to the cooking appliances protected by that system shall be shut off.

Simultaneous operation of another cooking appliance, hood, and branch duct system shall not be required, provided there is sufficient fire hazard separation between hoods and adjacent branch ducts. (See 3-1.4.)

(f)* Independent operation of a combination of:

(1) A system that protects only a portion of the common exhaust duct; and

(2) Cooking appliance, hood, and branch duct systems, two or more of which protect the remainder of the common exhaust ducts. [See Figure A-3-6.2(f).]

Simultaneous operation of another cooking appliance, hood, and branch duct system shall not be required, provided there is sufficient fire separation between hoods and adjacent branch ducts. (See 3-1.4.)

Upon operation of any system, the fuel or power to all protected cooking appliances served by the portion of the common exhaust duct being protected shall be shut off.

3-6.2.1 A fusible link or heat detector shall be located at each branch duct-to-common duct connection. Actuation of any branch duct-to-common exhaust duct fusible link or heat detector shall actuate the system protecting that portion of the common duct and shut off fuel or power to all protected hazards connected to that portion of the common exhaust duct.

Chapter 4 Plans and Acceptance Tests

4-1* Specifications. Specifications for wet chemical fire extinguishing systems shall be drawn up with care under the supervision of a competent person and with the advice of the authority having jurisdiction. To ensure a satisfactory system, the following items shall be included in the specifications.

The specifications shall:

(a) Designate the authority having jurisdiction and indicate whether plans are required.

(b) State that the installation conforms to this standard and meets the approval of the authority having jurisdiction.

(c) Indicate that only equipment that is referenced in the manufacturer's listed installation and maintenance manual or alternate suppliers' components that are listed for use with the specific extinguishing system shall be used.

Exception: Special auxiliary devices acceptable to the system manufacturer and the authority having jurisdiction.

(d) Include the specific tests, if any, that are required.

(e) Indicate the hazard to be protected and include such information as physical dimensions, cooking appliances, energy sources for each appliance, and air-handling equipment.

4-2 Plans. Where plans are required, the responsibility for their preparation shall be entrusted only to competent persons.

4-2.1 The plans shall be drawn to an indicated scale or be suitably dimensioned and shall be reproducible.

4-2.2 The plans shall contain sufficient detail to enable the authority having jurisdiction to evaluate the protection of the hazard(s).

4-2.3 The details on the system shall include the size, length, and arrangement of connected piping and the description and location of nozzles so that the adequacy of the system can be determined. Information shall be submitted pertaining to the location and function of detection devices, operating devices, auxiliary equipment, and electrical circuitry, if used.

4-2.4 Approval of Plans. Where plans are required, they shall be submitted to the authority having jurisdiction for approval before work starts.

4-2.5 Where field conditions necessitate any substantial change from the approved plan, the as-installed plans shall be submitted to the authority having jurisdiction for approval.

4-3 Approval of Installations. The completed system shall be tested by trained personnel as required by the manufacturer's listed installation and maintenance manual. The tests shall determine that the system has been properly installed and will function as intended.

4-3.1 The installer shall certify that the system has been installed in accordance with the approved plans and the manufacturer's listed installation and maintenance manual.

4-3.2* Where required by the authority having jurisdiction, the approval tests shall include a discharge of wet chemical in sufficient amounts to verify that the system is properly installed and functional.

4-3.3 The owner shall be provided with a copy of the manufacturer's listed installation and maintenance manual or listed owner's manual.

Chapter 5 Inspection, Maintenance, and Recharging

5-1 General.

5-1.1* A trained person who has undergone the instructions necessary to perform the maintenance and recharge service reliably and has the applicable manufacturer's installation and maintenance manual and service bulletins shall service the dry chemical fire extinguishing system at intervals not more than 6 months apart as outlined in Section 3-3.

5-1.2* Storage. Recharging supplies of wet chemical shall be stored in the original closed shipping container supplied by the manufacturer. These containers shall not be opened until the system is recharged.

5-1.2.1 Wet chemical supplies shall be maintained within the manufacturer's recommended storage temperature range.

5-1.3 Expellant Gas. A method and instructions shall be provided for checking the amount or the pressure of expellant gas to ensure that it is sufficient for the proper operation of the system.

5-1.4 System access for inspection or maintenance that requires opening panels in fire chases or ducts, or both, shall not be permitted while any appliance(s) or equipment protected by that system is in operation.

5-1.5 After any discharge, the following procedures shall be conducted in accordance with the manufacturer's listed installation and maintenance manual:

(a) The system shall be properly charged; and

(b) The system shall be placed in the normal operating condition.

CAUTION: Wet chemical, when discharged, is in the form of a fine spray. Some of the agent may settle on surrounding surfaces and could have a corrosive effect on electrical components and cooking equipment. Prompt cleanup will minimize staining or corrosion.

5-2 Owner's Inspection.

5-2.1 On a monthly basis, inspection shall be conducted in accordance with the manufacturer's listed installation

and maintenance manual or the owner's manual. As a minimum, this "quick check" or inspection shall include verification of the following:

- (a) The extinguishing system is in its proper location.
- (b) The manual actuators are unobstructed.
- (c) The tamper indicators and seals are intact.
- (d) The maintenance tag or certificate is in place.
- (e) No obvious physical damage or condition exists that might prevent operation.
- (f) The pressure gauge(s), if provided, is in operable range.
- (g) The nozzle blowoff caps are intact and undamaged.

5-2.2 If any deficiencies are found, appropriate corrective action shall be taken immediately.

5-2.3 Personnel making inspections shall keep records for those extinguishing systems that were found to require corrective actions.

5-2.4 At least monthly, the date the inspection was performed and the initials of the person performing the inspection shall be recorded.

5-3 Maintenance.

5-3.1* At least semiannually, maintenance shall be conducted in accordance with the manufacturer's listed installation and maintenance manual. As a minimum, such maintenance shall include:

- (a) A check to see that the hazard has not changed.
- (b) An examination of all detectors, the expellant gas container(s), the agent container(s), releasing devices, piping, hose assemblies, nozzles, alarms, all auxiliary equipment, and the liquid level of all nonpressurized wet chemical containers.
- (c)* Verification that the agent distribution piping is not obstructed.
- (d) Where semiannual maintenance of any wet chemical containers or system components reveals conditions such as, but not limited to, corrosion or pitting in excess of the manufacturer's limits, structural damage or fire damage, or repairs by soldering, welding, or brazing, the affected part(s) shall be replaced or hydrostatically tested in accordance with the recommendations of the manufacturer or the listing agency. The hydrostatic testing of wet chemical containers shall follow the applicable procedures outlined in Section 5-5.
- (e) All wet chemical systems shall be tested, which shall include a check of the detection system alarms and releasing devices, including manual stations and other associated equipment. A discharge of the wet chemical normally is not part of this test.
- (f) Where the maintenance of the system(s) reveals defective parts that could cause an impairment or failure of proper operation of the system(s), the affected parts shall be replaced or repaired in accordance with the manufacturer's recommendations.
- (g) The maintenance report, with recommendations, if any, shall be filed with the owner or with the designated party responsible for the system.

5-3.2* Fixed temperature-sensing elements of the fusible metal alloy type shall be replaced at least annually from the date of installation. They shall be destroyed when removed.

5-3.2.1 The year of manufacture and the date of installation of the fixed temperature-sensing element shall be marked on the system inspection tag. The tag shall be signed or initialed by the installer.

5-3.3 Fixed temperature-sensing elements other than the fusible metal alloy type shall be permitted to remain continuously in service, provided they are inspected and cleaned or replaced if necessary in accordance with the manufacturer's instructions every 12 months or more frequently to ensure proper operation of the system.

5-4* Recharging.

5-4.1 All extinguishing systems shall be recharged after use or as indicated by an inspection or when performing maintenance.

5-4.2 Systems shall be recharged in accordance with the manufacturer's listed installation and maintenance manual.

5-5 Hydrostatic Testing. The following parts of wet chemical extinguishing systems shall be subjected to a hydrostatic pressure test at intervals not exceeding 12 years:

- (a) Wet chemical containers;
- (b) Auxiliary pressure containers; and
- (c) Hose assemblies.

Exception No. 1: Auxiliary pressure containers not exceeding 2 in. (0.05 m) outside diameter and less than 2 ft (0.6 m) in length.

Exception No. 2: Auxiliary pressure containers bearing the DOT "3E" marking.

NOTE: DOT- or TC-marked cylinders may be required to be subjected to more frequent testing.

5-5.1 Wet chemical containers, auxiliary pressure containers, and hose assemblies shall be subjected to a hydrostatic test pressure equal to the marked factory test pressure or the test pressure specified by the manufacturer. No leakage, rupture, or movement of hose couplings shall be permitted. The test procedure shall be in accordance with the manufacturer's detailed written hydrostatic test instructions.

Exception: Containers bearing DOT or TC markings shall be tested or replaced in accordance with the appropriate DOT or TC requirements.

5-5.2 Wet chemical agent removed from the containers prior to hydrostatic testing shall be discarded.

5-5.3 To protect the hazard during hydrostatic testing, if there is no connected reserve, alternate protection acceptable to the authority having jurisdiction shall be provided.

Chapter 6 Referenced Publications

6-1 The following documents or portions thereof are referenced within this standard 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.

6-1.1 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101.

NFPA 70, *National Electrical Code*, 1993 edition.

NFPA 72, *National Fire Alarm Code*, 1993 edition.

Appendix A Explanatory Material

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

A-1-1 Scope. The wet chemical systems described in this standard are designed to discharge wet chemical from fixed nozzles and piping by means of expellant gas. The intent of the standard is to present the design considerations applicable to these systems.

The wet chemicals produced by various manufacturers usually are not identical in all characteristics, and each manufacturer designs equipment for use with a specific wet chemical. Therefore, system design principles applicable to the products of one manufacturer are not applicable to the products of another manufacturer. As a result, it is not practical to include system design details as part of this standard.

A-2-3.1.3 Stamping part numbers into the body of the nozzle is an acceptable method of meeting the identification requirement.

A-2-5.1 Piping. Pre-engineered systems do not need calculations for flow rate, pressure drop, and nozzle pressure, since they have been tested for fire extinguishment with minimum and maximum piping limitations and minimum and maximum temperature limitations. These limitations have been verified by testing laboratories and are published in the manufacturer's listed installation and maintenance manual.

A-2-6.1 Wet Chemical Solution Characteristics. A wet chemical solution is generally potassium carbonate-based, potassium acetate-based, or a combination thereof, and mixed with water to form an alkaline solution capable of being discharged through piping or tubing when under expellant gas pressure.

Its effect on fires in common cooking oils and fats is to combine with these materials to form a vapor suppression foam that floats on a liquid surface, such as in deep fat fryers, and effectively prevents reignition of the grease.

Extinguishing Mechanisms. Wet chemical solution applied to flammable liquid surfaces will result in the rapid spreading of a vapor-suppressing foam on the fuel surface. The foam extinguishes and secures the flame by forming a barrier between the liquid fuel and oxygen. This barrier excludes oxygen from the fuel source and eliminates the release of flammable vapors from the fuel surface. The cooling effect of this solution also lowers the temperature of the flammable fuel, further decreasing fuel vapor release.

A-3-2.1.6 Common exhaust ducts normally are located in concealed areas such that the need for manual discharge of the system may not be readily apparent. It is recommended that the number and location of remote controls, if any, be given careful consideration.

A-3-4 The phrase "wet chemical containers and expellant gas assemblies" is understood to include stored pressure assemblies.

A-3-6.2 One example of each acceptable method is presented in Figures A-3-6.2(a)-(f). These figures are not intended to be all-inclusive.

A-3-6.2(a) Separate cooking appliance, hood, and branch duct systems are interconnected so that they operate simultaneously. One or more of these systems also protect the entire common exhaust duct.

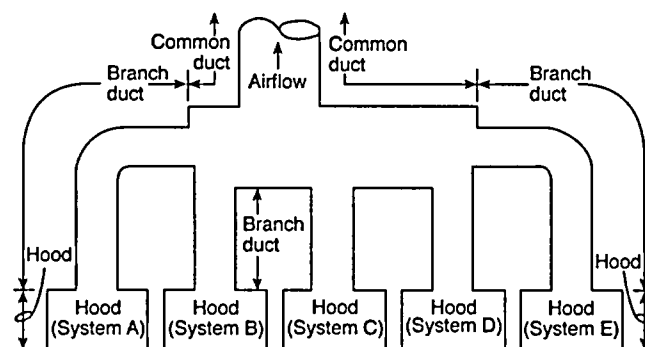


Figure A-3-6.2(a) Simultaneous operation of all systems.

Scenario: A fire is detected by System A. System A, protecting cooking appliances, a hood, and a branch duct, is operated. Simultaneously, Systems B, C, D, and E are also operated. All fuel or power to all protected appliances served by the common exhaust duct is shut off.

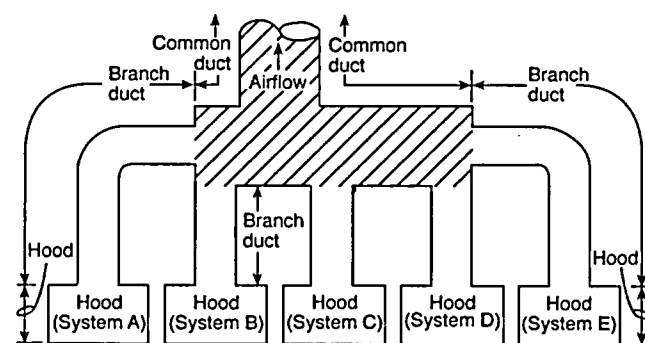


Figure A-3-6.2(b) Simultaneous operation of all systems that protect only the common exhaust duct.

A-3-6.2(b) Upon operation of the common exhaust duct systems, the fuel or power to all protected appliances served by the common exhaust duct is shut off.

Scenario No. 1: A fire is detected by one of the systems protecting the common exhaust duct. All systems protecting the common exhaust duct are operated simultaneously. Fuel or power to all protected appliances served by the common exhaust duct is shut off.

Scenario No. 2: The cooking appliance, hood, and branch duct System A detects a fire. Only System A is operated, and only the fuel or power to the cooking appliances protected by System A is shut off.

A-3-6.2(c) Simultaneous operation of another system or systems is not needed, provided there is sufficient fire hazard separation between hoods and adjacent branch ducts. (See 3-1.4.)

Each system protects a portion of the common exhaust duct so that the entire common exhaust duct is protected.

Each common exhaust duct system protects a portion of the common exhaust duct and, when operated, shuts off fuel or power to all protected cooking appliances served by that portion of the common exhaust duct.

Scenario No. 1: Common duct System 1 detects a fire and operates. Fuel or power to all cooking appliances protected by Systems A and B is shut off. Systems A and B are

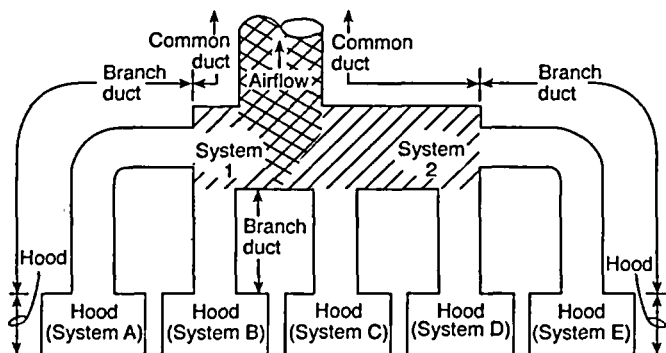


Figure A-3-6.2(c) Independent operation of systems that protect only the common exhaust duct.

not operated. Cooking appliances protected by Systems C, D, and E remain in operation.

Scenario No. 2: System A, B, C, D, or E detects a fire. Only the system detecting the fire operates, and only the fuel or power to the cooking appliances protected by that system is shut off.

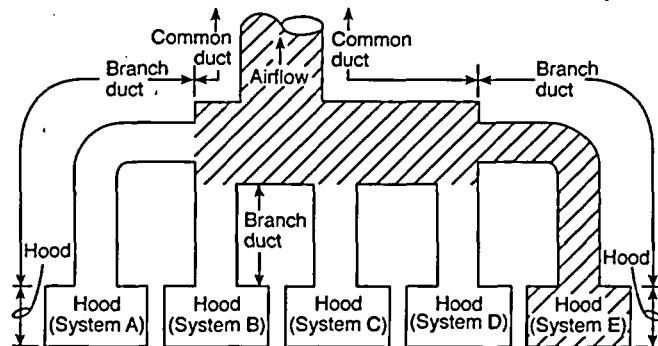


Figure A-3-6.2(d) Independent operation of cooking appliance, hood, and branch duct systems where one of these systems protects the entire common exhaust duct.

A-3-6.2(d) When the system that also protects the common exhaust duct operates, the fuel or power to all protected cooking appliances served by the common exhaust duct is shut off. If any other system is operated, only the fuel or power to the cooking appliances protected by that system is shut off.

Simultaneous operation of another system or systems is not needed, provided there is sufficient fire hazard separation between hoods and adjacent branch ducts. (See 3-1.4.)

Scenario No. 1: A fire is detected by System E, which also protects the common exhaust duct. System E operates, and the fuel or power to all cooking appliances served by the common exhaust duct is shut off.

Scenario No. 2: A fire is detected by System B. Only System B operates, and only the fuel or power to the cooking appliances protected by System B is shut off.

A-3-6.2(e) When a cooking appliance, hood, and branch duct system that also protects a portion of the common duct is operated, the fuel or power to all protected appliances served by that portion of the common exhaust duct is shut off.

When a system is operated that does not protect a portion of the common exhaust duct, only the fuel or power to the cooking appliances protected by that system is shut off.

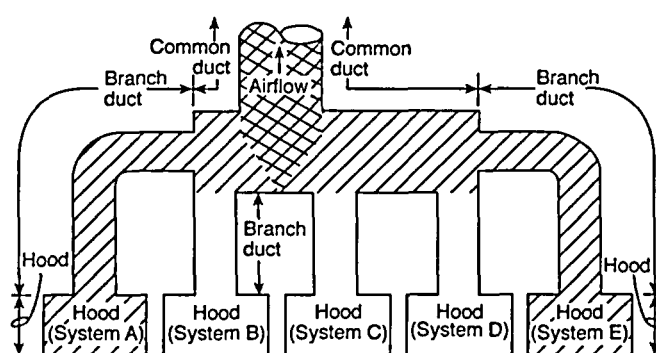


Figure A-3-6.2(e) Independent operation of cooking appliance, hood, and branch duct systems with two or more of these systems also protecting the common exhaust duct.

Simultaneous operation of another system or systems is not needed, provided there is sufficient fire hazard separation between hoods and adjacent branch ducts. (See 3-1.4.)

Scenario No. 1: System C operates upon detecting a fire. Fuel and power to the cooking appliances protected by System C are shut off. No other systems are affected.

Scenario No. 2: System E operates upon detecting a fire. Fuel or power to the cooking appliances served by that portion of the common exhaust duct is shut off; however, Systems C and D are not operated. Cooking appliances protected by Systems A and B are not affected.

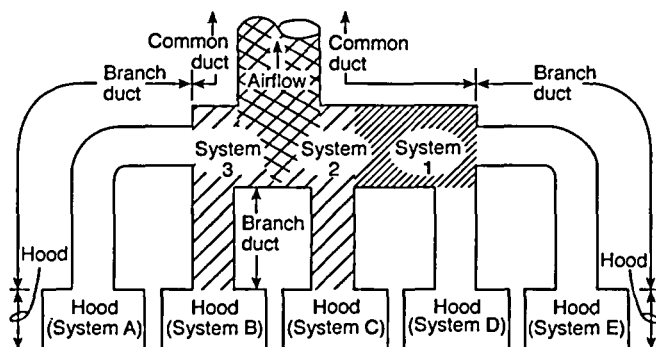


Figure A-3-6.2(f) Independent operation of (a) a combination of a system that protects only a portion of the common exhaust duct and (b) cooking appliance, hood, and branch duct systems, two or more of which protect the remainder of the common exhaust ducts.

A-3-6.2(f) Simultaneous operation of another cooking appliance, hood, and branch duct system is not needed, provided there is sufficient fire separation between hoods and adjacent branch ducts. (See 3-1.4.)

Upon operation of any system, the fuel or power to all protected cooking appliances served by the portion of the common exhaust duct being protected is shut off.

Scenario No. 1: A fire is detected by System B or C. If System B operates, the fuel or power to the protected cooking appliances of Systems A and B is shut off. System A is not operated.

If System C operates, only the fuel or power to the appliances protected by System C is shut off.

Scenario No. 2: A fire is detected by System D or E. Only that system operates, and only the fuel or power to the cooking appliances protected by that system is shut off.

Scenario No. 3: A fire is detected by System 1. Only System 1 operates, and only the fuel or power to the protected appliances served by Systems D and E is shut off. Systems D and E are not operated.

A-4-1 One of the first steps in the design and installation of a fire extinguishing system should be to keep good records. Establishment of a job file will provide a means of documentation. A good job file should contain all drawings, sketches, checklists, notes, maintenance agreements, and correspondence related to the installation from start to finish. Photographs are encouraged, and they should include a wide shot that shows the location of all appliances in the protected area at the time of installation. The photographs, as well as any checklists, drawings, or sketches, should be signed and dated.

A-4-3.2 When a discharge test is required, contact the particular system manufacturer for detailed functional discharge procedures. The use of substitute liquids, such as water, is not endorsed by all of the wet chemical extinguishing system manufacturers.

A-5-1.1 It is recommended that system designers and installers and maintenance personnel be retrained at least every 3 years to be updated with current information on system changes and service bulletins.

A-5-1.2 Quality. The characteristics of the system are dependent upon the composition of the wet chemical solution and the type of expellant gas, as well as upon other factors, and, therefore, it is imperative to use the wet chemical provided by the manufacturer of the system and the type of expellant gas specified by the manufacturer of the system.

Systems are designed on the basis of the flow and extinguishing characteristics of a specific formulation of wet chemical.

Storage. Storage of wet chemical solution in containers other than those supplied by the manufacturer may result in agent contamination or deterioration and confusion regarding its identity.

A-5-3.1 Regular service contracts with the equipment manufacturer or an authorized installation or maintenance company are recommended.

A-5-3.1(c) The following methods may be used for verifying that the piping is not obstructed:

- (a) Disassembly of all piping;
- (b) Conducting a full or partial discharge test;
- (c) Other methods recommended by the manufacturer.

A-5-3.2 The date of manufacture marked on fusible metal alloy sensing elements does not limit when they can be used. These devices have unlimited shelf life. The intent of 5-3.2 is to require replacement of fusible metal alloy sensing elements that have been installed for up to 1 year in environments subjecting them to contaminant-loading, such as grease in restaurant hoods and ducts that could adversely affect their proper operation.

A-5-4 Hazards to Personnel. Wet chemical solutions are relatively harmless and normally have no lasting significant effects on the skin, respiratory system, or clothing. They may produce mild, temporary irritation, but the symptoms usually will disappear when contact is eliminated. Irritation of the eyes should be treated by flushing with tap water for 15 minutes or longer. Any condition of prolonged irritation should be referred to a physician for treatment.

Disposal of wet chemical is best handled by flushing with water.

These systems are investigated to determine that they do not splash burning grease when installed in accordance with the manufacturer's listed installation and maintenance manual. It is known that potassium carbonate is moderately irritating to the skin and eyes and repeated skin contact may lead to dermatitis, but this is based on concentrations higher than those used in wet chemical extinguishing system units.

Appendix B Referenced Publications

B-1 The following documents or portions thereof are referenced within this standard for informational purposes only and thus are not 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.

B-1.1 ASTM Publication. American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

ASTM E380, *Standard for Metric Practice*, 1991.

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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.

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John B. Smith
Signature (Required)

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