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NFPA 17A Wet Chemical Extinguishing Systems 1990 Edition

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Policy Adopted by NFPA Board of Directors on December 3, 1982

The Board of Directors reaffirms that the National Fire Protection Association recognizes that the toxicity of the products of combustion is an important factor in the loss of life from fire. NFPA has dealt with that subject in its technical committee documents for many years.

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.

Statement on NFPA Procedures

This material has been developed under the published procedures of the National Fire Protection Association, which are designed to assure the appointment of technically competent Committees having balanced representation. While these procedures assure the highest degree of care, neither the National Fire Protection Association, its members, nor those participating in its activities accepts any liability resulting from compliance or noncompliance with the provisions given herein, for any restrictions imposed on materials or processes, or for the completeness of the text.

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NFPA 17A

Standard on

Wet Chemical Extinguishing Systems

1990 Edition

This edition of NFPA 17A, *Standard on 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 Fall Meeting held November 13-15, 1989 in Seattle, WA. It was issued by the Standards Council on January 12, 1990, with an effective date of February 5, 1990, and supersedes all previous editions.

The 1990 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 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 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 of Dry and Wet Chemical Extinguishing Systems. The 1990 edition is a partial revision.

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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.

Contents

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NOTE: 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 4 and Appendix B.

Chapter 1 Introduction

1-1* Scope.

1-1.1 The provisions of this standard apply to the design, installation, operation, testing, and maintenance of wet chemical pre-engineered 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 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 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 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 devices is equivalent in quality, effectiveness, durability, and safety to that prescribed by this standard.

1-2.2 Only persons properly trained shall be considered competent to design, install, and service pre-engineered wet chemical systems. It may 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 effectively discharge their respective duties.

1-3 Units.

1-3.1 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.*)

1-3.2 If a value is followed by an equivalent value in other units, the first stated value is to be regarded as the requirement. A given equivalent value may be approximate.

1-3.3 The conversion procedure for the SI units is to multiply the quantity by the conversion factor and then round the result to the appropriate number of significant digits.

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 or 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 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."

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

CTC. The Canadian Transport Commission, which has jurisdiction over compressed gas cylinders and cartridges.

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 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.

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.

Pre-Engineered Systems. Those having predetermined flow rates, nozzle pressures, and quantities of liquid agent. These systems may 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 and piping and nozzle configurations are contained in the manufacturer's listed installation and maintenance manual which is part of the listing.

Shall. Indicates a mandatory requirement.

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

Trained.* One who has undergone the instructions necessary to design, 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 interchangably with "wet chemical".

Chapter 2 Restaurant Hood, Duct, and Cooking Appliance Pre-Engineered Systems

2-1 General Information and Requirements.

2-1.1* Wet Chemical. The type of wet chemical used in the system shall not be substituted unless listed for the particular system, recommended by the manufacturers of the equipment, and approved by the authority having jurisdiction. Systems are designed on the basis of the flow and extinguishing characteristics of a specific formulation of wet chemical.

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

2-2 Use, Limitations, and Applications.

2-2.1 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.

NOTE: Check the manufacturer's listed installation and maintenance manual for a detailed description of the specific types of cooking appliances and vapor removal equipment covered by the listing. For additional information see NFPA 96, *Standard for the Installation of Equipment for the Removal of Smoke and Grease-Laden Vapors from Commercial Cooking Equipment.*

2-2.2 Applications. See manufacturer's listed installation and maintenance manual for system limitations and applications for which wet chemical extinguishing systems shall be considered satisfactory protection. Only listed system components referenced or permitted in the manufacturer's listed installation and maintenance manual shall be installed as part of the system.

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 clean-up will minimize staining or corrosion.

2-2.3 Each protected cooking appliance(s), individual hood(s), and branch exhaust duct(s) directly connected to the hood shall be protected by a system or systems designed for simultaneous operation.

2-3* Personnel Safety.

2-3.1 Wet Chemical. Wet chemical solutions are relatively harmless and normally have no lasting significant effects on skin, respiratory system, or clothing. They may produce mild, temporary irritation, but the symptons 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.

2-3.2 Disposal of wet chemical is best handled by flushing with water.

2-4 Specifications, Plans, and Approvals.

2-4.1* Specifications. Specifications for wet chemical fire extinguishing systems shall be drawn up with care under supervision of a competent person and with the advice of the authority having jurisdiction. To ensure a satisfactory system, the following items shall be 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 listed equipment from a single manufacturer shall be used.

Exception: Special auxiliary devices acceptable to the manufacturer and the authority having jurisdiction may be used.

(d) Include the specific tests, if any, that may be required to meet the approval of the authority having jurisdiction.

(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.

2-4.2 Plans. Where plans are required, the responsibility for their preparation shall be entrusted only to competent persons.

2-4.2.1 Plans shall be drawn to an indicated scale or be suitably dimensioned and shall be reproducible.

2-4.2.2 Plans shall contain sufficient detail to enable the authority having jurisdiction to evaluate the protection of the hazard(s).

2-4.2.3 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.

2-4.3 Approval of Plans. Where plans are required, they shall be submitted to the authority having jurisdiction for approval before work starts.

2-4.3.1 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.

2-4.4 Approval of Installations. The completed system shall be tested by trained personnel as required by the manufacturer's listed installation and maintenance manual and the authority having jurisdiction. These tests shall determine that the system has been properly installed and will function as intended.

2-4.4.1 The installer shall certify to the authority having jurisdiction that the system has been installed in accordance with the approved plans and the manufacturer's listed installation and maintenance manual.

2-4.4.2* When 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. The method of verification shall be acceptable to the authority having jurisdiction.

NOTE: Hydrostatic testing of the distribution piping is not required.

2-4.4.3 After any discharge, all piping and nozzles shall be cleaned or flushed in accordance with the manufacturer's listed installation and maintenance manual.

2-4.4.4 After any discharge, the system shall be properly charged and placed in the normal operating condition.

2-5 Operation and Control Systems.

2-5.1 Methods of Actuation. All systems shall have both automatic and manual methods of actuation.

2-5.1.1 Automatic detection and system actuation shall be in accordance with the manufacturer's listed installation and maintenance manual.

2-5.1.2 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.

2-5.1.3* At least one manual control for actuation 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 do not require a remote manual actuator.

2-5.1.4 Manual actuators shall not require a pull of more than 40 lbs (178 newtons) (force) nor a movement of more than 14 in. (35.6 cm) to effect operation.

2-5.1.5 Where multiple systems are installed, all remote manual actuators shall be identified as to the hazard being protected.

2-5.2 Operating Devices. Operating devices shall include releasing mechanisms, wet chemical discharge controls, and accessory equipment.

2-5.2.1 All operating devices shall be designed for service they will encounter and shall not be rendered inoperative or susceptible to accidental operation. Devices shall be designed to function properly through a minimum temperature range from 32°F (0°C) to 120°F (49°C).

2-5.2.2 All devices shall be designed, located, installed, or protected so that they are not subject to mechanical, environmental, or other conditions that would render them inoperative or cause inadvertent operation of the system.

2-5.2.3 All devices shall be considered integral parts of the system and shall function with the system operation.

2-5.2.4 An alarm or indicator shall be provided to show the system has operated, that personnel response may 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 the appropriate signaling standard (NFPA 71, 72A, 72B, 72C, or 72D) so that the actuation of the extinguishing system will sound the fire alarm as well as provide the function of the extinguishing system.

2-6 Supervision.

2-6.1 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.

2-6.2 Alarms or indicators that indicate a fault in supervised devices or equipment shall give prompt audible or visual indication of any such trouble and shall be distinctive from alarms or indicators indicating operation or hazardous conditions.

2-7 Wet Chemical and Expellant Gas Supply.

2-7.1 Quantity. The amount of wet chemical in the system shall be sufficient for the largest single hazard protected, or for the group of hazards that are to be protected simultaneously.

2-7.2* Quality. The wet chemical used in the system shall be supplied by the manufacturer of the fire protection equipment.

2-7.3* 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.

2-7.4 Expellant Gas. A method and instructions shall be provided for checking the amount or the pressure of expellant gas to assure that it is sufficient for the proper operation of the system.

2-7.5 Wet chemical supplies shall be maintained within the manufacturer's recommended storage temperature range.

2-8* System Location.

2-8.1 Wet chemical containers and expellant gas assemblies shall be located within the minimum and maximum temperature range — generally 32°F (0°C) to 120°F (49°C) — indicated in the manufacturer's listed 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.

2-8.2 Wet chemical containers and expellant gas assemblies shall not be located where they would be subjected to mechanical, chemical, or other damage. When 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.

2-8.3 Wet chemical containers and expellant gas assemblies shall be located where they shall be accessible for inspection, maintenance, and recharge.

2-8.4 Wet chemical container and expellant gas assemblies shall be located near the hazard or hazards protected, but not where they will be exposed to the fire.

2-9 Distribution System.

2-9.1 Wherever "pipe" is used in this standard it shall be understood to also mean "tube."

2-9.2 Pipe and Fittings. Pipe and fittings shall be of noncombustible material having physical and chemical characteristics compatible with the wet chemical solution. Pipe shall be steel or stainless steel. Fittings shall be steel; stainless steel; cast, malleable or ductile iron. The pressure rating of the pipe, fittings, and connection joints shall withstand the maximum expected pressure in the piping system. When steel pipe incorporating welded joints or rolled groove fittings is used, a minimum wall thickness of 0.188 in. (5 mm) is permitted. When steel pipe is joined by threaded fittings or by cut groove couplings, the minimum pipe thickness shall be in accordance with Schedule 40.

Pipe fittings shall be compatible with the piping materials and connection method.

NOTE: Check the manufacturer's listed installation and maintenance manual for correct pipe, tubing, and fittings for its system.

2-9.2.1 Galvanized pipe and fittings shall not be used.

2-9.2.2 Other types of pipe, tubing, and fittings that have been investigated and listed for this service may be used. The use of such pipe, tubing, and fittings shall involve careful consideration of the following factors:

(a) Pressure rating

(b) Corrosion (chemical and electrolytic)

(c) Methods of joining

(d) Resistance to fire exposure and rapid temperature changes

(e) Flow characteristics.

2-9.2.3 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.

2-9.3* Arrangement and Installation of Pipe and Fittings. Pipe and fittings shall be installed in accordance with the manufacturer's listed installation and maintenance manual.

2-9.3.1 Pipe shall be reamed and cleaned before assembly. Pipe-thread compound or tape shall not be used in agent distribution pipe and fitting connections.

Exception: Pipe thread tape shall be permitted when installed in accordance with the manufacturer's listed installation manual.

2-9.3.2 The piping system shall be rigidly supported to prevent movement and shall not be subject to mechanical or other damage.

2-9.4 Discharge Nozzles. Discharge nozzles shall be listed for the purpose.

2-9.4.1 Discharge nozzles shall be provided with an internal strainer or a separate listed strainer located immediately upstream of the nozzle.

2-9.4.2 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.

2-9.4.3 All nozzles shall be installed or protected so that they are not subject to mechanical, environmental, or other conditions that would render them inoperative.

2-9.4.4 Discharge nozzles shall be so connected and supported that they may not be readily put out of alignment.

2-9.4.5* Discharge nozzles shall be permanently marked for identification.

2-9.4.6 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.

2-9.4.7 Nozzle Determination. Nozzles shall be selected in accordance with the manufacturer's listed installation and maintenance manual.

2-10 Electrical Wiring and Equipment. Electrical wiring and equipment shall be installed in accordance with NFPA 70, *National Electrical Code®*, or the requirements of the authority having jurisdiction.

2-11 Shutdown Devices.

2-11.1 Wet chemical extinguishing systems shall be provided with an automatic means to ensure the shutdown of fuel or power to the protected appliances, and other appliances located under ventilating equipment protected by the extinguishing system, upon system actuation.

CAUTION: The discharge of wet chemical extinguishing agent on energized electrical appliances has the potential to cause an electrical shock.

2-11.2 All shutdown devices shall be considered integral parts of the system and shall function with the system operation. Shutdown devices shall be of the type that requires manual resetting to restore fuel or power.

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.

2-12 Special Requirements.

2-12.1 Systems protecting two or more common hoods, plenums, or both shall be installed to ensure the simultaneous operation of all systems protecting the hoods, plenums, and associated cooking appliances located below the hoods.

2-12.2* 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 systems on protecting the common exhaust duct. See Figure A-2-12.2(a).

(b) A system or multiple systems operating simultaneously for the protection of the common duct only. See Figure A-2-12.2(b).

(c) Multiple systems operating individually to protect a portion of the common duct only. See Figure A-2-12.2(c).

(d) One or more nozzles from a single hood and duct system protecting the entire common duct. See Figure A-2-12.2(d).

(e) One or more nozzles from multiple hood and duct systems each protecting a portion of the common duct so that the entire common duct is protected. See Figure A-2-12.2(e).

(f) Multiple systems operating independently, each protecting a portion of the common duct and/or a hood or restaurant. See Figure A-2-12.2(f).

NOTE: Multiple tenancy applications require the concerted cooperation of design, installation, operation, and maintenance responsibilities by both tenants and the building owner.

2-12.2.1 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.

2-12.2.2 The building owner(s) shall be responsible for the protection of the 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.

2-12.3 A fusible link or heat detector shall be provided above each protected cooking appliance.

Exception: A fusible link or heat detector is not required above cooking appliances located directly below the exhaust duct provided a fusible link or heat detector is installed at the entrance or not more than 12 in. (30.5 cm) into the duct.

2-12.4 The owner of the restaurant shall be provided with a copy of the manufacturer's listed installation and maintenance manual or listed owner's manual that describes system operation, required maintenance, and recharging.

Chapter 3 Inspection, Maintenance, Recharging, and Hydrostatic Testing

3-1* General. The procedure for inspection, maintenance, and recharging of wet chemical extinguishing systems varies considerably. Minimal knowledge is necessary to perform a monthly "quick check" or monthly inspection in order to follow the inspection procedure as outlined in Section 3-2.

A person who has been trained by the extinguishing system manufacturer and has the manufacturer's listed installation and maintenance manual shall service the wet chemical fire extinguishing system at intervals not more than 6 months apart as outlined in Section 3-3 (*see A-1-4.1*).

3-1.1 System access for inspection and service that requires opening panels in fire chases and/or ducts shall not be permitted while any appliance(s) or equipment protected by that system are in operation.

3-2 Inspection.

3-2.1 On a monthly basis inspection shall be conducted in accordance with the manufacturer's listed installation and maintenance manual. As a minimum, this "quick check" or inspection shall include the following:

(a) The extinguishing system is in its proper location.

(b) Manual actuators are unobstructed.

(c) Tamper indicators and seals are intact.

(d) Maintenance tag or certificate is in place.

(e) No obvious physical damage or condition exists that may prevent operation.

(f) Pressure gage(s), if provided, are in operable range.

(g) Nozzle blowoff caps are intact and undamaged.

3-2.2 If any deficiencies are found, appropriate corrective action shall be taken immediately.

3-2.3 Personnel making inspections shall keep records for those extinguishing systems that were found to require corrective actions.

3-2.4 At least monthly the date the inspection was performed and the initials of the person performing the inspection shall be recorded.

3-3 Maintenance.

3-3.1 At least semiannually, maintenance shall be conducted in accordance with the manufacturer's listed installation and maintenance manual. As a minimum, such maintenance shall consist of the following:

(a) Check to see that the hazard has not changed.

(b) Examine all detectors, expellant gas container(s), wet chemical container(s), releasing devices, piping, nozzles, alarms, and all auxiliary equipment.

(c)* Verify that the agent distribution piping is not obstructed.

(d) When semiannual maintenance of any wet chemical containers or system components reveals conditions such as, but not limited to, corrosion or pitting in excess of manufacturer's limits; structural damage or fire damage; 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 original certifying agency or both. The hydrostatic testing of wet chemical containers shall follow the applicable procedures outlined in Section 3-5.

(e) All wet chemical systems shall be tested; this testing 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 is normally not part of this test.

(f) When the maintenance of the system(s) reveals defective or damaged 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.

3-3.2 Fixed temperature sensing elements of the fusible alloy type shall be replaced at least annually or more frequently if necessary to assure proper operation of the system (consult the manufacturer's listed installation and maintenance manual).

3-4 Recharging.

3-4.1 All extinguishing systems shall be recharged after use or as indicated by an inspection or when performing maintenance.

3-4.2 Systems shall be recharged in accordance with the manufacturer's listed installation and maintenance manual.

3-5 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. (.05 m) outside diameter and less than 2 ft (.6 m) in length.

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

NOTE: DOT or CTC marked cylinders may require more frequent test intervals.

3-5.1 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 is permitted. The test procedure shall be in accordance with the manufacturer's detailed written hydrostatic test instructions.

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

3-5.2 Wet chemical agent removed from the containers prior to hydrostatic testing shall be discarded.

3-5.3 Care shall be taken to ensure that all tested equipment is thoroughly dried prior to reuse.

3-5.4 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 4 Referenced Publications

4-1 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.

4-1.1 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101

NFPA 70-1990, *National Electrical Code*

NFPA 71-1989, *Standard for the Installation, Maintenance and Use of Central Station Signaling Systems*

NFPA 72A-1987, *Standard for the Installation, Maintenance and Use of Local Protective Signaling Systems for Guard's Tour, Fire Alarm and Supervisory Service*

NFPA 72B-1986, *Standard for the Installation, Maintenance and Use of Auxiliary Protective Signaling Systems for Fire Alarm Service*

NFPA 72C-1986, *Standard for the Installation, Maintenance and Use of Remote Station Protective Signaling Systems*

NFPA 72D-1986, *Standard for the Installation, Maintenance and Use of Proprietary Protective Signaling Systems.*

Appendix A

This Appendix is not a part of the requirements of this NFPA document, but is included for information 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 an expellant gas. The intent of the standard is to present the design considerations applicable to those 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-1-4.1 Trained. A trained person is one who has been trained by and is currently authorized by the manufacturer to design, install, and service his equipment.

A-2-1.1 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 the 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 the solution also lowers the temperature of the flammable fuel, further decreasing vapor release.

A-2-3 Hazards to Personnel. 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. Tests conducted in accordance with the Code of Federal Regulations Title 49 indicated no reaction to the extinguishing agent on human skin. 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.

A-2-4.1 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, check lists, 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 check lists, drawings, or sketches, should be signed and dated.

A-2-4.4.2 When a discharge test is required, contact the particular system manufacturer for his 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-2-5.1.3 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-2-7.2 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.

A-2-7.3 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-2-8 The phrase "wet chemical containers and expellant gas assemblies" is understood to include stored pressure assemblies.

A-2-9.3 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-2-9.4.5 Part numbers stamped into the body of the nozzle is an acceptable method of meeting the identification requirement.

A-2-12.2 One example of each acceptable method is presented below. These figures are not intended to be all inclusive.

A-3-1 Regular service contracts with the equipment manufacturer or his authorized installation or maintenance company are recommended.

A-3-3.1(c) The following methods that may be used for verifying that the piping is not obstructed:

(a) disassemble all piping
(b) conduct full or partial discharge test
(c) consult manufacturer for alternate means
(d) other methods recommended by the manufacturer.

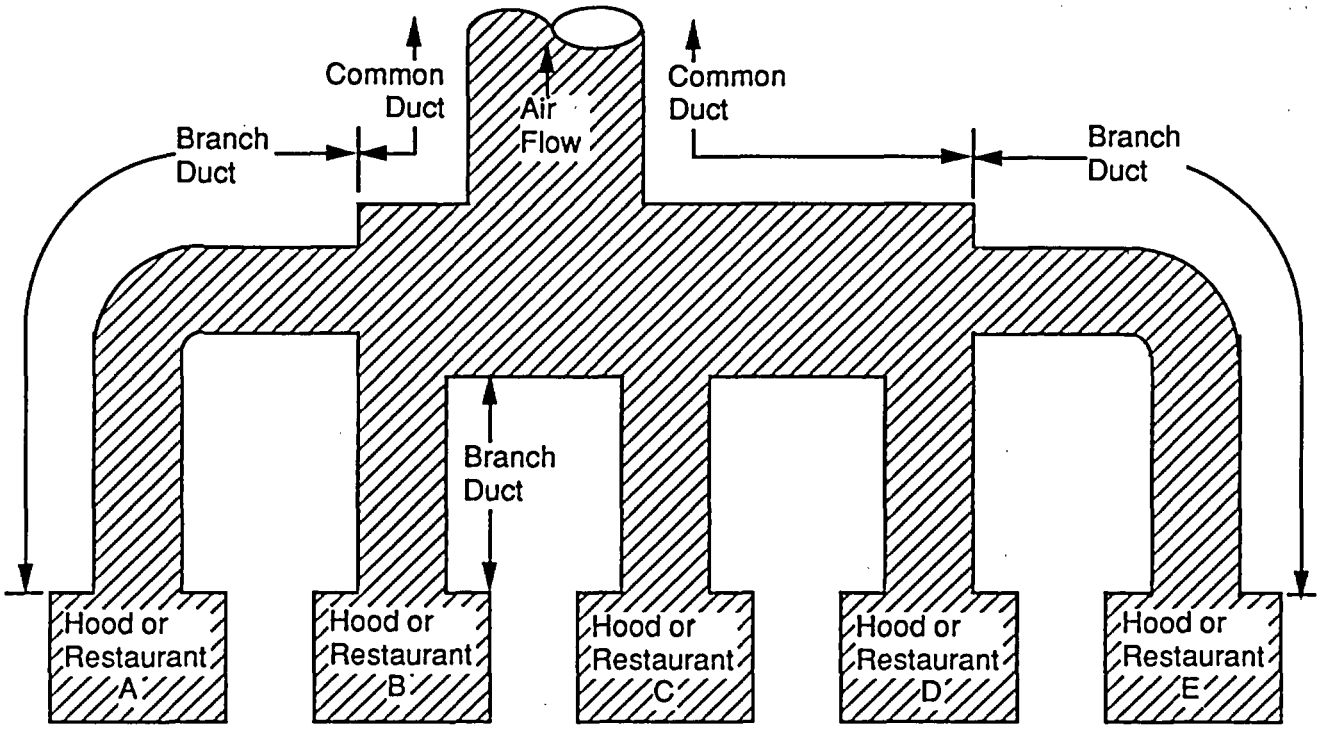

Figure A-2-12.2(a).

Simultaneous operation of all systems.

Separate extinguishing systems in all hoods or restaurants that are interconnected and operate simultaneously if a fire occurs in any hood or restaurant.

SCENARIO:

A fire originates in hood or Restaurant "A." The system protecting appliances of hood or Restaurant "A" is actuated. Simultaneously, the systems protecting appliances of hoods or Restaurants B, C, D, and E are also actuated. All fuel or power to all protected appliances is shut down in conjunction with the simultaneous discharges.

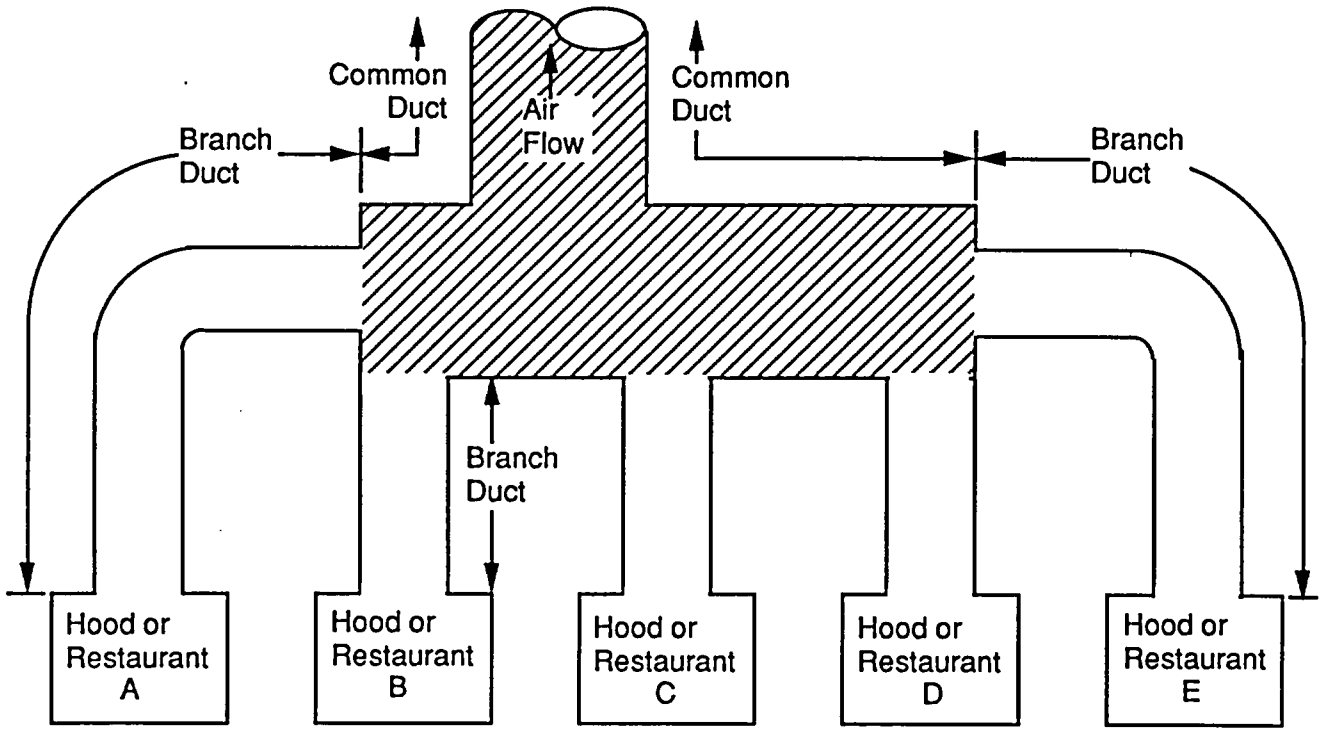

Figure A-2-12.2(b).

A single system or multiple systems operating simultaneously for the protection of the common duct only.

A common duct extinguishing system that, when actuated, discharges agent into the common duct and shuts down fuel and power to all protected appliances in hoods or restaurants connected to the common duct.

SCENARIO:

A fire originates in hood or restaurant "B" and spreads to the common duct. The system(s) protecting the common duct automatically detects the fire and discharges the agent into the common duct. At the same time, all fuel or power to all protected appliances in all hoods or restaurants served by the common duct is to be shut down.

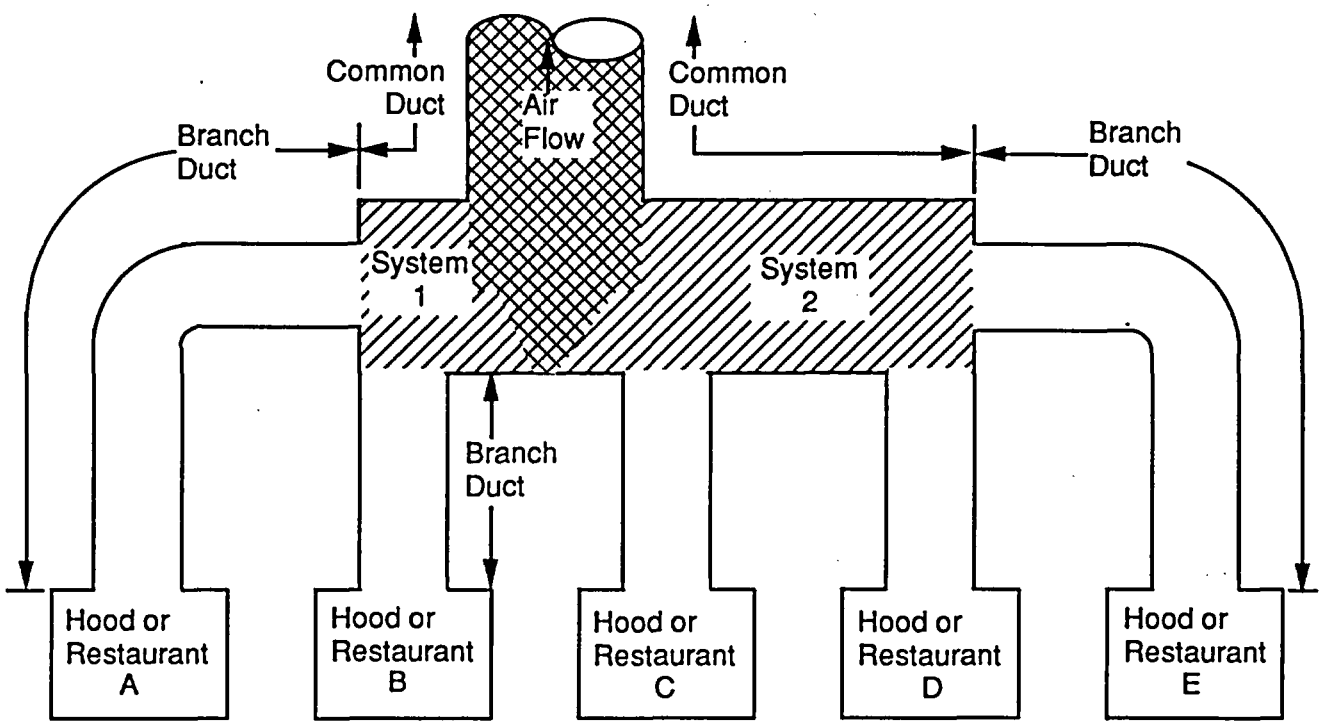

Figure A-2-12.2(c).

Multiple systems operating independently for the protection of portions of the common duct only so that the entire common duct is protected.

A separate common duct extinguishing system that, when activated, discharges agent into its segment of the common duct and shuts down fuel and power to all protected appliances in hoods or restaurants connected to that protected segment of the common exhaust duct.

SCENARIO:

A fire originates in hood or Restaurant "A" and spreads to the common duct. Common duct system #1 automatically detects the fire and discharges the agent into the common duct. At the same time, all fuel or power to all protected appliances in both hoods or restaurants A and B is to be shut down. Hoods or Restaurants C, D, and E may remain in operation unless system #2 also detects the fire and is actuated.

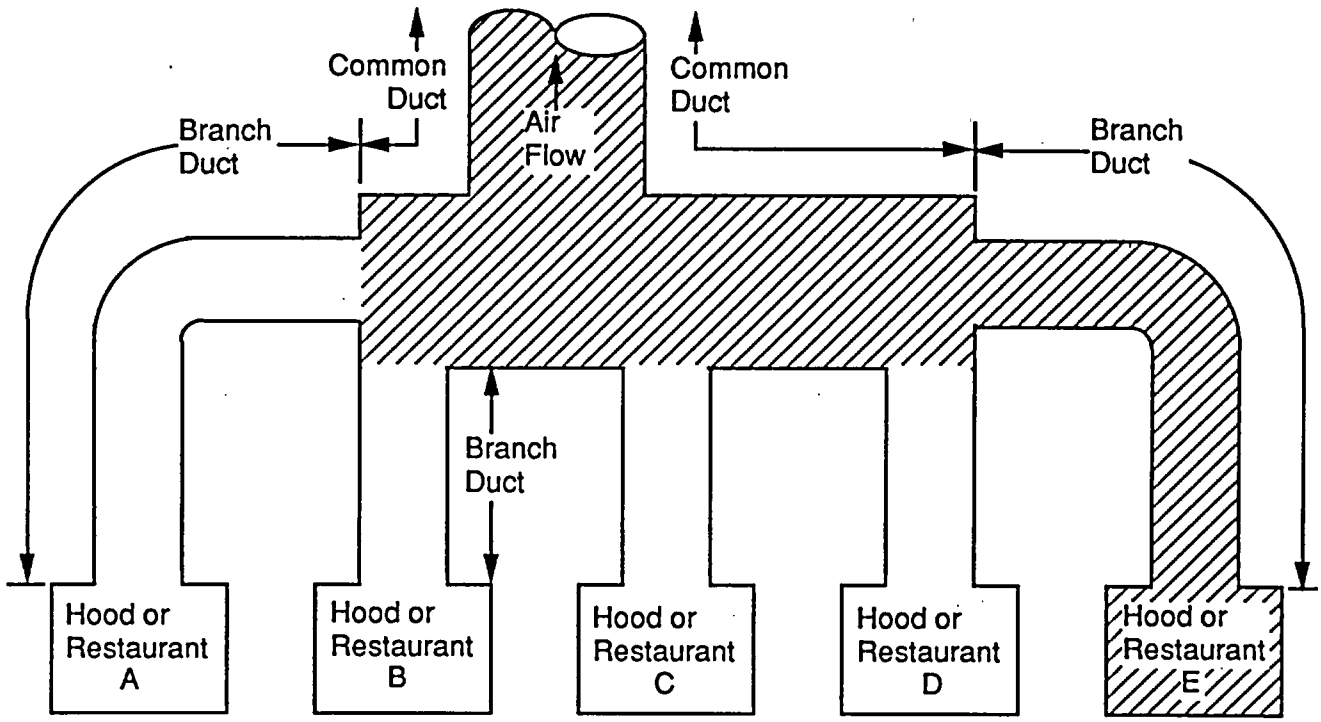

Figure A-2-12.2(d).

One or more nozzles from a single hood and duct system protecting the entire common duct.

An extinguishing system that protects a single hood or restaurant and the common duct. A fire in the common duct actuates the extinguishing system and shuts down fuel and power to all protected appliances in hoods or restaurants connected to the common duct.

SCENARIO #1:

A fire originates in hood or restaurant "E." The system automatically detects the fire and discharges agent both on the protected appliances and restaurant "E" and throughout the common duct. At the same time, all fuel and power to all other hoods or restaurants serviced by the common duct is to be shut down.

SCENARIO #2:

A fire originates in hood or restaurant "B" and spreads to the common duct. The system protecting the common duct (from hood or restaurant "E") automatically detects the fire and discharges agent both into the common duct and on the appliances and hood or restaurant "E." At the same time, all fuel or power to all protected appliances is shut down.

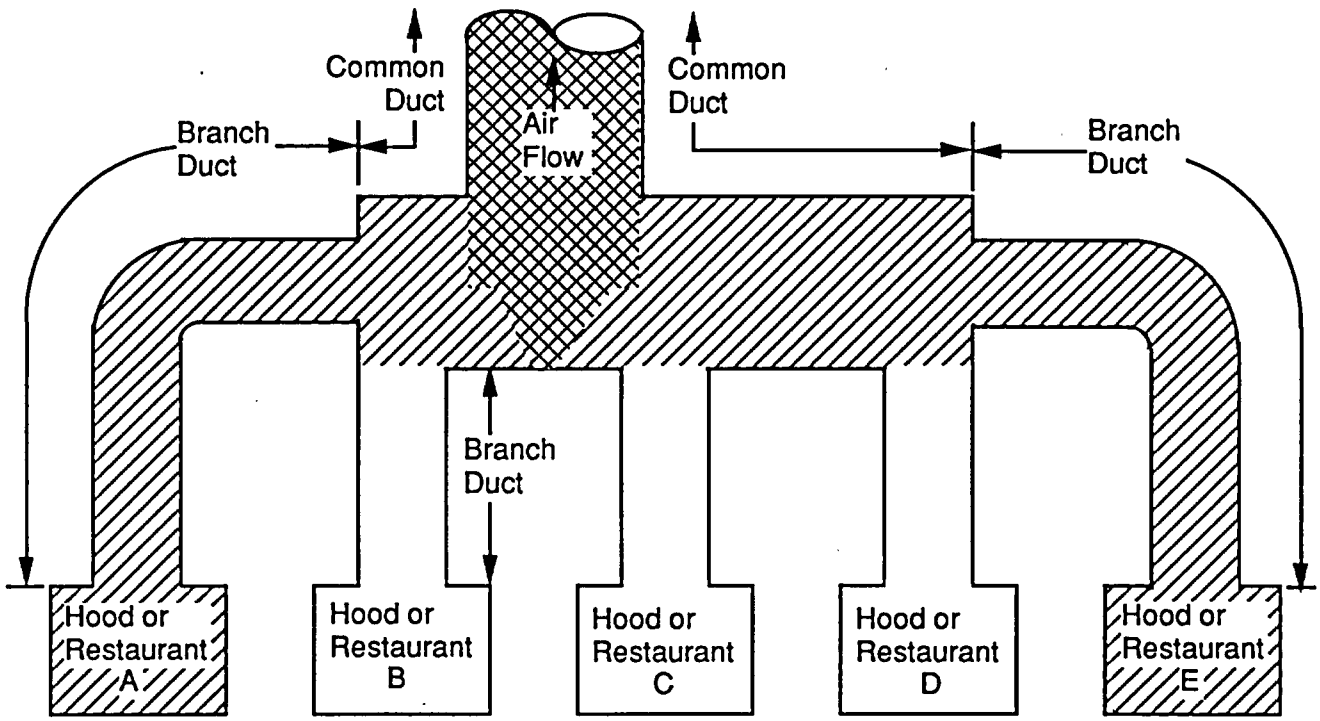

Figure A-2-12.2(e).

One or more nozzles from multiple hood and duct systems not necessarily operating simultaneously, each protecting a portion of the common duct so that the entire common duct is protected.

An extinguishing system that protects a single hood or restaurant and a portion of the common duct. A fire in the hood or restaurant or the protected portion of the common duct actuates the system in the hood or restaurant and shuts down fuel and power only to protected appliances in those hoods or restaurants connected to the protected portion of the common exhaust duct.

SCENARIO #1:

A fire originates in hood or restaurant "B" and spreads to the common duct. The common duct system (from hood or restaurant "A") automatically detects the fire and discharges agent both in the common duct and on the protected appliances in hood or restaurant "A." At the same time, all fuel or power to protected appliances in hoods or restaurants A and B is shut down. Hood or Restaurants C, D, and E may remain in operation unless the system protecting their portion of the appliances in hoods also detects the fire and is acuated, at which time agent will be discharged into hood or restaurant "E" and the fuel or power shut down to hoods or restaurants C, D and E.

SCENARIO #2:

A fire originates in hood or restaurant "E." The system detects the fire and is actuated. At the same time, all fuel or power to protected appliances in hoods or restaurants C and D is to be shut down. Hoods or Restaurants A and B may continue in operation unless the system protecting their portion of the common duct detects the fire and is actuated, at which time agent will be discharged into hood or restaurant "A" and all fuel or power to protected appliances in hoods or restaurants A and B will be shut down.

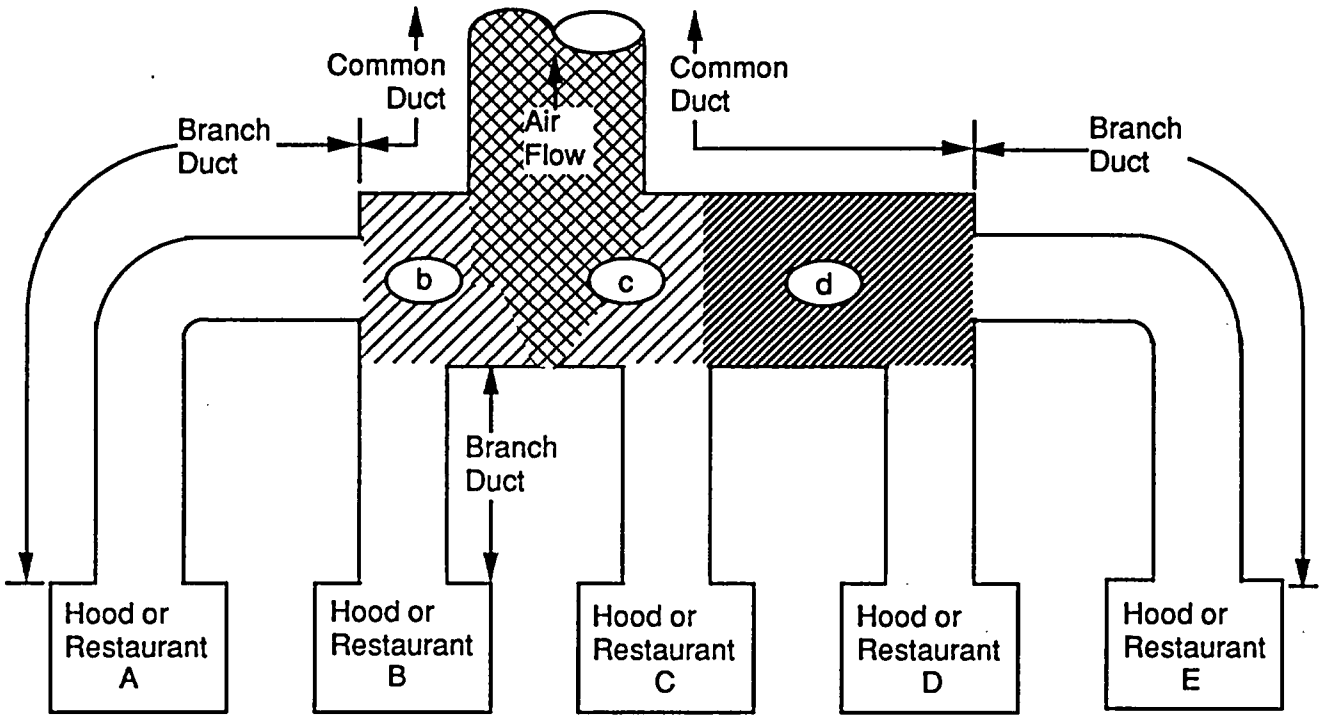

Figure A-2-12.2(f).

Multiple systems operating independently, each protecting a portion of the common duct and/or a hood or restaurant.

Multiple systems each separately protecting the portion of the common duct at each hood or restaurant connection. These systems, designated by lower case letters, may be part of the hood or restaurant system or they may be separate independent systems.

In the above figure, common duct system "b" is part of hood or restaurant system "B." Common duct systems "c" and "d" are separate, independent systems from hood or restaurant systems "C" and "D."

Scenario #1:

A fire originates in hood or restaurant "B," activating system "B" and "b." All fuel and power to protected appliances located in hood or restaurant "B" is shut down. All other hoods or restaurants continue to operate.

Scenario #2:

A fire in the common duct actuates system "d," which discharges and shuts off fuel and power to all protected appliances in hood or restaurant "D." System "D" does not actuate unless a fire occurs in hood or restaurant "D." All other hoods or restaurants continue to operate.

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

NFPA 72E-1987, *Standard on Automatic Fire Detectors*

NFPA 96-1987, *Standard for the Installation of Equipment for Removal of Smoke and Grease-Laden Vapors from Commercial Cooking Equipment.*

B-1.2 Other Publication.

ASTM E-380, *Standard for Metric Practice.*

Index

SUBMITTING PROPOSALS ON NFPA TECHNICAL COMMITTEE DOCUMENTS

Contact NFPA Standards Administration for final date for receipt of proposals on a specific document.

INSTRUCTIONS

Please use the forms which follow for submitting proposed amendments. Use a separate form for each proposal.

1. For each document on which you are proposing amendment indicate:
   (a) The number and title of the document
   (b) The specific section or paragraph.

2. Check the box indicating whether or not this proposal recommends new text, revised text, or to delete text.

3. In the space identified as "Proposal" include the wording you propose as new or revised text, or indicate if you wish to delete text.

4. In the space titled "Statement of Problem and Substantiation for Proposal" state the problem which will be resolved by your recommendation and give the specific reason for your proposal including copies of tests, research papers, fire experience, etc. If a statement is more than 200 words in length, the technical committee is authorized to abstract it for the Technical Committee Report.

5. Check the box indicating whether or not this proposal is original material, and if it is not, indicate source.

6. 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.

7. Type or print legibly in black ink.

NOTE: The NFPA Regulations Governing Committee Projects in Paragraph 10-10 state: Each proposal shall be submitted to the Council Secretary and shall include:

(a) identification of the submitter and his affiliation (Committee, organization, company) where appropriate, and

(b) identification of the document, paragraph of the document to which the proposal is directed, and

(c) a statement of the problem and substantiation for the proposal, and

(d) proposed text of proposal, including the wording to be added, revised (and how revised), or deleted.

FORM FOR PROPOSALS ON NFPA TECHNICAL COMMITTEE DOCUMENTS

Mail to: Secretary, Standards Council
National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101

Note: All proposals must be received by 5:00 p.m. E.S.T./E.S.D.T. on the published proposal closing date.

Date 5/18/85 Name John B. Smith Tel. No. 617-555-1212

Address 9 Seattle St., Seattle, WA 02255

Representing (Please indicate organization, company or self) Fire Marshals Assn. of North America

1. a) Document Title: Protective Signaling Systems NFPA No. & Year NFPA 72D

   b) Section/Paragraph: 2-7.1 (Exception)

FOR OFFICE USE ONLY
Log #:
Date Rec'd:
Proposal #:

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

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:

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

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

I agree to give NFPA all and full rights, including rights of 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

PLEASE USE SEPARATE FORM FOR EACH PROPOSAL

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Note: All proposals must be received by 5:00 p.m. E.S.T./E.S.D.T. on the published proposal closing date.

Date _____ Name _____ Tel. No. _____

Address _____

Representing (Please indicate organization, company or self) _____

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

   b) Section/Paragraph: _____

FOR OFFICE USE ONLY
Log #: _____
Date Rec'd: _____
Proposal #: _____

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

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

Cut Here

4. Statement of Problem and Substantiation for Proposal:

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

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

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