NFPA No.

32

DRYCLEANING PLANTS 1974

NATIONAL FIRE PROTECTION ASSOCIATION

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Standard for

Drycleaning Plants

NFPA No. 32 — 1974

1974 Edition of No. 32

This edition of the Standard for Drycleaning Plants was adopted at the NFPA Annual Meeting held in May in Miami, Florida, on recommendation of the Sectional Committee on Drycleaning as approved by the Flammable Liquids Correlating Committee. It supersedes the 1972 Edition.

This 1974 edition has numerous changes from the 1972 edition. These changes, other than editorial, are indicated by a vertical line by the side of the new or revised material. Additionally, a new numbering system is used in this edition.

Origin and Development of No. 32

This standard was originally prepared by the Committee on Flammable Liquids in 1924 and 1925, in cooperation with the National Association of Dyers and Cleaners. The first edition was adopted by the Association in 1925. Amendments were adopted in 1927, complete revised editions in 1936, 1944, 1954 and 1956, amendments in 1964, a completely revised edition in 1970 and amendments in 1972.

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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.

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Standard for

Drycleaning Plants

NFPA No. 32 — 1974

Chapter I General Provisions

1-1 Purpose.

This Standard is intended to provide reasonable safeguards for the prevention and control of fire and explosion hazards incident to drycleaning operations and for the protection of the employees and the public.

1-2 Scope.

This Standard applies to establishments hereinafter defined as drycleaning plants.

1-3 Retroactivity.

Existing plants, equipment, building, structure, and installation in compliance with the provisions of a previous edition of this Standard in effect at the time of installation may be continued in use provided that such continuous use does not constitute a distinct hazard to life or adjoining property.

1-4 Definitions.

BONDED or GROUNDED as protection against static electricity shall mean either that a bond or ground has been deliberately applied or that an electrically conductive path having a resistance adequate for the intended purpose, usually one million ohms or less, is inherently present by the nature of the installation.

DRYCLEANING shall mean the process of removing dirt, grease, paints and other stains from wearing apparel, textiles, fabrics, rugs, etc., by the use of nonaqueous liquids (solvents). Methods of drycleaning include:

(a) Immersion and agitation with the solvent in closed machines.

(b) "Brushing" or "scouring" with cleaning solvents.

DRYCLEANING PLANT shall mean a plant in which drycleaning and associated operations are conducted, including office, receiving, and storage rooms.

DRYCLEANING ROOM shall mean a room in which the drycleaning operations are conducted, including all additional sections containing solvent or solvent handling equipment.

DRYCLEANING UNITS or DRYCLEANING MACHINES shall mean any equipment in which textiles are immersed or agitated in solvent or in which drycleaning solvent is extracted from textiles.

DRYING TUMBLERS shall mean any equipment in which solvent cleaned textiles are tumbled, agitated, and dried or deodorized while circulating heated air through the load to remove the solvent. A reclaiming tumbler shall mean a drying tumbler as defined above, which, in addition, reclaims the solvent from vapors.

FLASH POINT shall mean the minimum temperature of a liquid at which sufficient vapor is given off to form an ignitible mixture with the air near the surface of the liquid or within the vessel used as determined by appropriate test procedure and apparatus as specified below.

The flash point of liquids having a viscosity less than 45 SUS at 100°F (37.8°C) and a flash point below 200°F (93.4°C), shall be determined in accordance with the *Standard Method of Test for Flash Point* by the Tag Closed Tester, ASTM D-56-73.*

The flash point of liquids having a viscosity of 45 SUS or more at 100°F (37.8°C) or a flash point of 200°F (93.4°C) or higher shall be determined in accordance with the *Standard Method of Test for Flash Point* by the Pensky-Martens Closed Tester, ASTM D-93-73.*

GALLON shall mean a U.S. gallon.

SOLVENT or LIQUID CLASSIFICATION shall mean a method for classifying solvents or liquids according to the following classes:

Class I Solvents — Liquids having a flash point below 100°F (37.8°C).

Class II Solvents — Liquids having a flash point at or above 100°F (37.8°C) and below 140°F (60°C).

Class IIIA Solvents — Liquids having a flash point at or above 140°F (60°C) and below 200°F (93.4°C).

*Available from American Society for Testing and Materials, 1916 Race St., Philadelphia, Pa. 19103.

Class IIIB Liquids having a flash point at or above 200°F (93.4°C)

Class IV Solvents — Liquids classified as nonflammable.

SPOTTING (prespotting) shall mean the local application of solvent to spots of dirt, grease, paints and stains for removal of the same.

SYSTEM CLASSIFICATION shall mean, for the purpose of this Standard, that drycleaning plants or systems are arranged in the following four classes:

Class I — Systems utilizing Class I solvents (Example — 50° flash point naphtha).

Class II — Systems employing Class II solvents and complying with the requirements of Chapter II (Example — Stoddard solvent).

Class III — Systems employing Class IIIA solvents and complying with the requirements of Chapter III, Section 3-1 (Example — 140°F Class solvent) and, Systems employing Class IIIB liquids and complying with the requirements of Chapter III, Section 3-2 (Example — specially compounded oils).

Class IV and Class V — Systems employing Class IV solvents and complying with the requirements of Chapters IV and V respectively (Example — Perchlorethylene).

TANK, STORAGE. A storage tank shall mean a tank used for the storage of new or distilled solvent.

TANK, TREATMENT. A treatment tank shall mean a tank used for settling, filtering, caustic treatment or other operating purposes.

1-5 General Requirements.

1-5.1 Except as provided in 2-7, drycleaning by immersion and agitation in open vessels shall be prohibited.

1-5.2 Drycleaning by immersion and agitation in closed machines shall be carried on only with machinery and equipment designed, installed, and operated in accordance with this Standard.

1-5.3 Before any drycleaning plan is established or constructed, the class of solvent is changed, or an existing plant is remodeled, plans and specifications shall be submitted for examination and approval to the authority having jurisdiction. These plans shall be drawn to an indicated scale, showing relative location of dry-

cleaning building, boiler room, finishing building or departments, storage tanks for solvents, pumps, washers, drying tumblers, filters, stills, processing tanks, interconnecting piping, etc., and show sectional elevation of the buildings including lowest floors, pits, tanks, their fittings, devices, etc.

1-5.4 Machines shall be furnished by the manufacturers with nameplates indicating the class of solvent for which each machine is designed. Written instructions shall be given the buyer, covering proper installation and safe operating methods of using equipment and solvent.

1-5.5 The use of solvents with a flash point below that for which a machine is designed shall be prohibited.

1-5.6 Operations related to the drycleaning business, such as laundering, scouring, scrubbing, pressing, ironing, etc., shall not be classed as "other occupancies" for the purpose of this Standard.

1-6 Class I. Class I drycleaning plants or systems utilizing Class I solvents shall be prohibited.

Chapter II

Class II. Drycleaning Plants

2-1 Scope and Location.

2-1.1 This chapter shall apply to drycleaning plants or systems utilizing Class II solvents or to plants utilizing Class IIIA solvents but which do not comply with the requirements of Chapter III.

2-1.2 The drycleaning building shall be located so that it is accessible from at least one side for fire fighting and fire control purposes. Except as provided in 2-1.3, the drycleaning building shall be located not closer than 10 feet to the line of adjoining property.

2-1.3 The distance required in 2-1.2 may be waived if the wall facing the line of adjoining property is a blank wall having a fire resistance rating of not less than two hours.

2-1.4 Drycleaning operations shall not be carried on in the same building with other occupancies.

2-2 Construction.

2-2.1 Drycleaning and tank storage rooms shall be restricted to the lowest floor level of a building. Such rooms shall not be located below grade or above any other story.

2-2.2 A building housing the drycleaning room shall be protected throughout by an approved automatic sprinkler system in accordance with the *Standard for the Installation of Sprinkler Systems, NFPA No. 13.*

2-2.3 Walls shall be of masonry or noncombustible construction and wall finish shall be plain or plastered without furring or concealed spaces (*see also 2-2.8*).

2-2.4 Floors of a drycleaning room shall be of fire-resistive construction with a wearing surface of noncombustible and solvent-resistant material.

2-2.5 The floor or roof and ceiling construction above a drycleaning room shall have a fire resistance rating of not less than one hour.

2-2.6 A drycleaning room shall be designed to provide an emergency drainage system to direct solvent leakage and fire protection water to a safe location. This may require curbs, scuppers, or special drainage system to control the spread of fire. Appendix A of *Water Spray Fixed Systems for Fire Protection, NFPA No. 15*, provides information on such protection.

2-2.6.1 An emergency drainage system, if connected to a public sewer or discharged into a public waterway, shall be equipped with a trap or separator. Drycleaning room shall be designed to prevent the normal discharge of solvents to public waterways, public sewers, or adjoining property.

2-2.7 A drycleaning room shall have not less than two doors as a means of egress located at opposite ends of the room at least one of which shall lead directly outside. Door openings form a drycleaning room shall be provided with noncombustible and solvent-resistant ramps or sills of not less than 3 inches in height to retain any solvent accidentally spilled on the floor. A permissible alternate to the sill or ramp is an open grated trench inside the room at the doorway, which drains to a safe location.

2-2.8 Where related operations such as permitted by 1-5.6 are done on the same floor as the drycleaning operations, the drycleaning room shall be cut off from the rest of the plant by fire partitions having a fire resistance rating of not less than two hours. Any opening in such partition shall be protected by an approved fire door suitable for Class B openings.

2-2.9 Drying or deodorizing shall be done either in cabinets or tumblers specifically designed for that purpose or in a separate room. If the drying or deodorizing is done in such cabinets or tumblers, they may be located inside or adjacent to the drycleaning room. If the drying or deodorizing is done in a separate room, such room shall be constructed with walls, paritions and ceiling having a fire resistance rating of not less than two hours. Openings in walls or partitions of such rooms shall be protected by approved fire doors

suitable for Class B openings. The room shall be ventilated in accordance with 2-3.1. If such drying room is in a separate building, that building shall conform in all respects to the requirement for the drycleaning room.

2-3. Ventilation, Heat, Light, Power and Static Electricity.

2-3.1 A mechanical system of ventilation with means for remote control shall be installed in drycleaning rooms in accordance with the *Standard for Air Conditioning, NFPA No. 90A*, and the *Standard for Blower and Exhaust Systems, NFPA No. 91.* A system serving a drycleaning room shall serve no other room. The ventilation system shall have sufficient capacity to exhaust 1 cfm per square foot of floor area from the drycleaning room to a safe outdoor location.

2-3.2 The blades or running rings of exhaust fans shall be of nonferrous metal, and motors for fans shall not be installed in ducts.

2-3.3 Electrical equipment and wiring in a Class II drycleaning room shall comply with provisions of the *National Electrical Code, Articles 500 and 501 — Hazardous Location, Class I, Division 2.*

2-3.4 Heating shall be by steam or hot water only.

2-3.5 Boilers shall be located, when possible, in a detached building. When in the same building and in a room adjoining the drycleaning room, the boiler room shall be cut off by fire partitions, without openings, having a fire resistance rating of not less than two hours. Openings into boiler room shall be at least 10 feet from any openings into the cleaning room.

2-3.6 Storage tanks, treatment tanks, filters, pumps, piping, drycleaning units, stills, drying cabinets, tumblers, and other equipment in the drycleaning room shall be bonded together and grounded. Isolated units of equipment shall be grounded.

2-3.7 Special consideration shall be given to the generation and accumulation of static electricity when loading fabrics into or removing fabrics from drycleaning units. When fabrics are transferred from one piece of equipment to another, the two pieces of equipment shall be electrically bonded together.

2-4 Storage Tanks, Treatment Tanks and Filters.

2-4.1 General.

2-4.1.1 Tanks shall be constructed and installed in accordance with the *Flammable and Combustible Liquids Code, NFPA No. 30, Chapter II* except as otherwise provided.

2-4.1.2 Storage tanks and atmospheric treatment tanks installed aboveground shall be provided with emergency relief venting to relieve excessive internal pressure which may be caused by exposure fire. The total capacity of an emergency venting device, including the capacity of any normal vent, shall be not less than that derived from Table 2-4.1.2. The air flows specified in Table 2-4.1.2 may be multiplied by 0.3 for tanks installed in the sprinklered drycleaning rooms. The wetted area of a tank or container shall be calculated on the basis of 100 percent of the surface area of the tank. Atmospheric tanks shall be limited to pressures not exceeding 2.5 psig under emergency venting conditions.

Table 2-4.1.2

Wetted Area Versus Cubic Feet Free Air per Hour (14.7 psia and 60°F.)

Sq. Ft.	CFH	Sq. Ft.	CFH	Sq. Ft.	CFH
20	21,100	70	73,700	120	126,000
30	31,600	80	84,200	140	147,000
40	42,100	90	94,800	160	168,000
50	52,700	100	105,000	180	190,000
60	63,200			200	211,000

NOTE: Interpolate for intermediate values.

2-4.1.3 In no case shall a vent be less than 1¼ inch pipe size. The vent of a tank installed inside a building shall terminate outside the building.

2-4.1.4 An inside storage or treatment tank shall be equipped with a gaging device designed and installed so that solvent or vapors will not be discharged into the building during normal service. A gage glass or sight glass which when broken will permit the escape of solvent from the tank shall not be used.

2-4.2 Storage and Treatment Tanks.

2-4.2.1 Solvent storage tanks shall be underground or outside aboveground, except that not more than two solvent storage tanks with a capacity not to exceed 1,500 gallons each may be located unenclosed aboveground inside a drycleaning room.

2-4.2.2 Aboveground treatment and storage tanks inside drycleaning plants shall not exceed a capacity of 1500 gallons each and the aggregate capacity permitted in an unenclosed area shall not exceed 7,500 gallons. Capacities in excess of 7,500 gallons shall be located in a separate room as provided in 2-4.2.6.

2-4.2.3 An inside storage tank shall be provided with a fill pipe terminating outside the building.

2-4.2.4 Aboveground inside storage tanks shall be located as close as practicable to the drycleaning unit(s) to which they are connected.

2-4.2.5 Treatment tanks shall not be used for the storage of new or distilled solvents.

2-4.2.6 If operational consideration requires that inside aboveground treatment and storage tanks exceed the aggregate capacity of 7,500 gallons, additional inside aboveground tanks are permitted only in areas located in accordance with 2-2.1, with drainage as specified in 2-2.6 and 2-2.6.1. The area shall be separated from all other areas of the plant by construction having a fire resistance rating of at least two hours. Openings to other areas of the plant shall be provided with noncombustible liquid-tight raised sills or ramps at least 4″ in height or the equivalent. Openings shall be provided with approved self-closing fire doors. The room shall be liquid-tight where the walls join the floor.

2-4.2.7 Treatment tanks subject to greater than atmospheric pressures shall be designed for a working pressure not less than 15 psig and shall be built in accordance with the principles of the *ASME Boiler and Pressure Vessel Code, Section VIII, Pressure Vessels, Division 1, 1971 Edition.** Such tanks shall be equipped with pressure relief device which will prevent the pressure in the tank from rising more than 10 percent above the working pressure of the tank. The relief device shall be not smaller than ¾ inch pipe size and shall discharge into an underground tank or aboveground base tank of a drycleaning unit without a shutoff valve in the line.

*Available from American Society for Testing and Materials, 1916 Race St., Philadelphia, PA 19103.

2-4.3 Filters.

2-4.3.1 Filters operating above atmospheric pressure shall be ASME approved pressure vessels, or shall be constructed to withstand, without bursting, a pressure of 5 times the maximum allowable working pressure, or to withstand without yielding a pressure of 2½ times the maximum allowable working pressure. *See Section VIII, Pressure Vessels, Division 1, 1971 Edition of the ASME Boiler and Pressure Vessel Code* for test methods.*

2-4.3.2 Pressure type filters shall be equipped with a reliable pressure gage which shall be regularly checked for accuracy; filters shall not be operated at pressures exceeding that recommended by the manufacturers.

2-4.3.3 Pressure filters shall be provided with an air bleeding valve and line connected to discharge into the washer or into the storage tank vent line. Such air bleeding lines shall not discharge into the room.

2-4.3.4 Filters shall be equipped with pressure relief devices which will prevent the pressure within the filter from rising more than 10 percent above the working pressure of the filter. The relief device shall be not smaller than ¾ inch pipe size and shall discharge into an underground tank or aboveground base tank of a drycleaning unit without a shutoff valve in the line.

2-5 Pumps, Piping and Solvent Coolers.

2-5.1 The aboveground transfer of solvent between any tank or equipment shall be through closed circuits of iron or steel piping. Brass or bronze valves or fittings may be used. Flexible hoses suitable for the solvent may be used as required for low pressure connections not to exceed 5 psig to vibrating or other than stationary equipment. Low melting point materials, such as aluminum, copper and brass; or materials which soften on fire exposure, such as plastics; or nonductile material, such as cast iron, may be used underground for all flammable and combustible liquids within the pressure and temperature limits of *ANSI B31, American National Standard Code for Pressure Piping**. Piping, valves and fittings shall be installed and tested according to the *Flammable and Combustible Liquids Code, NFPA No. 30.*

*Available from the American Society of Mechanical Engineers, United Engineering Center, 345 East 47th St., New York, NY 10017.

2-5.2 Flow sightglasses, the breakage of which would permit the escape of flammable liquids, shall be of a type not readily damaged by heat and shall be reliably protected against physical damage.

2-5.3 Service pumps shall be provided to remove sludge from underground tanks. The suction pipe shall be carried to the tank bottom and the pump shall discharge to a suitable container. In no case shall the discharge be into a sewer.

2-5.4 All pumps handling solvent shall be designed for use with flammable liquids. Pumps of the positive displacement type shall be fitted with a relief valve or bypass, set so as to prevent pressures in excess of the working pressure of the system.

2-5.5 For static protection on pumps and piping installations see 2306.

2-5.6 When a continuous solvent flow circulation is maintained by means of a circulating pump, solvent coolers shall be provided to maintain a solvent temperature not exceeding 90°F. Visual and audible alarm devices shall be provided to warn the operator when the solvent temperature exceeds 90°F.

2-6 Drycleaning Units, Stills, Drying Cabinets or Tumblers.

2-6.1 All equipment of this class shall be approved and in accordance with the following general requirements:

2-6.1.1 All solvent-handling equipment and components thereof shall be constructed to prevent solvent leakage.

2-6.2 Drycleaning units shall comply with all the requirements of Section 2-6.1 and with the following:

2-6.2.1 Drycleaning units shall be of substantial construction to prevent distortion of their components and to prevent objectionable vibration while the machines are in normal operation. The units shall be securely attached to the floor or, if necessary, to special foundations to minimize transmission of vibration to surrounding areas.

2-6.2.2 Drycleaning units shall be provided with doors or covers that prevent solvent from splashing on the floor. The door shall be interlocked to prevent rotating of the cylinder or basket while the doors are open, or to prevent opening of the doors while the cylinder is rotating; the interlock shall however permit inching the cylinder at slow speed.

2-6.2.3 Drycleaning units shall be equipped with brakes or other suitable means to stop the machine within reasonable time. Brakes shall be designed to avoid creation of sparks or excessive heat. If drycleaning units are equipped with automatic controls, a manual push button to stop the machine shall be provided in front of the unit.

2-6.2.4 Drycleaning units shall be provided with a suitable device that will shut off the solvent inlet supply to the machine in the event the solvent level in the machine reaches the bottom of the trunnion shaft. An overflow means below the maximum level and connected to an underground tank by a pipe at least one size larger than the inlet solvent pipe to the machine and without shut-off valve shall be considered compliance with the requirements of this paragraph.

2-6.2.5 Individual button or lint traps shall be provided with drycleaning units, located between the machine drain and the storage tank.

2-6.2.6 The solvent inlet pipe into a drycleaning unit shall be arranged to deflect the solvent stream away from the door opening.

2-6.2.7 Drycleaning units shall be constructed with sufficient clearance between the cylinder or basket and the outer casing to prevent striking or rubbing of parts of the rotating cylinder against the outer casing.

2-6.2.8 Drycleaning units shall be furnished with one or more suitably placed nameplates indicating the following: Minimum allowable solvent flash point, the maximum allowable cylinder speed, warnings that the unit shall not be operated with a solvent having a flash point less than that stated, or to be operated in excess of such cylinder speed; and the door shall not be opened until the cylinder has come to a complete standstill.

2-6.3 Stills, in addition to complying with the preceding general requirements, shall be in accordance with the following:

2-6.3.1 Steam or hot water only shall be used as the source of heat. If steam is used, a pressure regulating valve shall be installed in the steam supply line to the still.

2-6.3.2 Stills shall be liquidtight and gastight.

2-6.3.3 Stills shall be designed for operation on the vacuum principle.

2-6.3.4 If a relief valve is provided, it shall be equipped with a vent line extending to the outside.

2-6.3.5 A check valve shall be installed in the steam line between the boiler and the still.

2-6.3.6 Each still shall be provided with a combination vacuum and pressure gage.

2-6.3.7 Each still shall be equipped with an automatic valve to maintain the solvent level in the still at the proper height.

2-6.4 Drying tumblers and drying cabinets, in addition to complying with the preceding general requirements, shall be in accordance with the following:

2-6.4.1 Drying tumblers shall be of substantial construction, well secured to substantial foundations, and shall be provided with self-closing explosion hatches having an area equal to at least one-third square foot for each 30 cubic feet of cylinder volume. Hatches shall be arranged to open away from the operator.

2-6.4.2 Drying tumblers and drying cabinets shall be ventilated to the outside air by means of properly constructed pipes or ducts connected to an exhaust fan of sufficient capacity to remove all dust, vapors, or lint generated by the process. Such discharge pipes or ducts shall be carried to a height of not less than six feet above the roof, and shall be provided with cleanout facilities.

2-6.4.3 Discharge pipes shall not terminate within ten feet measured horizontally from any door, window or frame walls of any adjoining or adjacent building.

2-6.4.4 The fan shall be properly housed and so interlocked as to insure operation while the drying tumbler is in use. The fan, blades, or running rings shall be constructed of nonferrous metal. In no case shall the fan motor be mounted within the ventilating duct.

2-6.4.5 Steam or hot water only shall be used to obtain the necessary temperatures in the drying tumblers or cabinet.

2-7 Scouring, Brushing and Spotting.

2-7.1 All scouring, brushing and spotting or prespotting shall be conducted with nonflammable solvents or with Class II or Class III liquids or solvents, except that Class I solvents may be used if stored in approved safety cans of not more than one gallon capacity.

2-7.2 The brushing or prespotting table on which articles are soaked in solvent, shall have a liquidtight top with a curb on all sides not less than one inch high. The top of the table shall be

pitched so as to ensure thorough draining to a 1½ inch drain connected to a suitable container especially provided and marked for that purpose.

2-7.3 The scouring or brushing table or scrubbing tub shall be so located as to ensure thorough and effective disposal of solvent vapors through the ventilating system.

2-7.4 Articles, the character of which prevents their washing in the usual washing machines, may be cleaned on scouring or brushing tables or in scrubbing tubs provided the total amount of solvent used in such open containers shall not exceed three gallons. Scrubbing tubs shall be secured to the floor and shall be provided with permanent 1½ inch trapped drains to a suitable container especially provided and marked for that purpose.

2-7.5 Metal scrubbing tubs and metal tops of spotting tables shall be permanently and effectively grounded.

2-8. Operating Requirements.

2-8.1 Machines shall be operated in accordance with operating instructions furnished by the machinery manufacturer. All employees shall be thoroughly instructed as to the hazards involved in their departments, in the work they perform and the locations of switches to cut off the flow of solvents.

2-8.2 All materials to be drycleaned shall be thoroughly searched in the receiving room and all foreign materials, especially matches and metallic substances, removed.

2-8.3 In removing materials from the washer, provisions shall be made for minimizing the dripping of solvent on the floor. When materials are transferred from a washer to a drain tub, a nonferrous metal drip apron shall be placed so as to rest on the drain tub and the cylinder of the washer.

2-8.4 The lint and refuse shall be removed from all traps after the close of the day's work, deposited in approved waste cans, removed from the premises and disposed of safely. At all other times the trap covers shall be kept securely in place.

2-8.5 Proper maintenance and operating practices shall be adhered to which will tend to prevent leakage or accidental escape of solvent and the accumulation of lint.

2-8.6 Flammable or combustible liquids shall not be used for cleaning floors.

2-8.7 The repairing and cleaning of tanks shall be performed in accordance with the *Standard for Cleaning or Safeguarding Small Tanks and Containers, NFPA No. 327.*

2-9. Fire Control.

2-9.1 A building housing the drycleaning room shall be protected throughout by an approved automatic sprinkler system in accordance with the *Standard for the Installation of Sprinkler Systems, NFPA No. 13.*

2-9.2 Drycleaning units, washer-extractor, shall be provided with an automatic carbon dioxide extinguishing system installed and maintained in accordance with the *Standard for Carbon Dioxide Extinguishing Systems, NFPA No. 12,* or if acceptable to the authority having jurisdiction, a manual steam jet not less than ¾ inch with a continuously available steam supply at a pressure of not less than 15 psig.

2-9.3 Each drying tumbler shall be provided with an approved carbon dioxide or steam injection extinguishing system arranged to operate automatically in case of fire in the tumbler.

2-9.4 Suitable portable fire extinguishers shall be provided throughout the drycleaning plant in accordance with the *Standard for Portable Fire Extinguishers, NFPA No. 10.*

2-9.5 Not less than two approved 10-BC portable fire extinguishers shall be provided inside a drycleaning room, near the doors.

2-9.6 In order that reliable operation of steam or other extinguishing system may be assured, periodic inspection of all valves and piping shall be made.

2-9.7 Smoking in a drycleaning room shall be strictly prohibited. "NO SMOKING" signs shall be posted.

Chapter III

Class III. Cleaning Plants

3-1 Class IIIA Cleaning Plants

3-1.1 Scope.

3-1.1.1 This section applies to drycleaning plants or systems utilizing Class IIIA Solvents. The provisions of Chapter II shall apply with the exceptions provided in this section 3-1.

3-1.1.2 Solvents, other than Class IIIA, shall not be used and the equipment, the installation, and the operation of the system shall comply with the requirements outlined in this section 3-1.

3-1.2 Location, Constructions and Electricity.

3-1.2.1 Class IIIA drycleaning plants located in a building with other occupancies shall be protected by an approved automatic sprinkler system in accordance with the *Standard for the Installation of Sprinkler Systems, NFPA No. 13* and shall be cut off vertically and horizontally from such other occupanices by partitions having a fire resistance rating of not less than two hours. All vertical and horizontal openings to other occupancies shall be protected by approved automatic fire doors suitable for Class B openings.

3-1.2.2 In Class IIIA drycleaning plants located in buildings with no other occupancies, the drycleaning room shall be cut off from the rest of the plant by partitions having a fire resistance rating of not less than two hours with all openings to the rest of the plant protected by approved automatic fire doors suitable for Class B openings. If the entire building is protected by an approved automatic sprinkler system, the drycleaning room need not be cut off.

3-1.2.3 Electrical equipment and wiring of a Class IIIA plant or systems shall comply with the provisions of the *National Electrical Code, NFPA No. 70,* for ordinary locations except that on stills or drying tumblers, in which the solvent is ordinarily heated above the flash point, the electrical components and wiring on such equipment shall be in accordance with the *National Electrical Code, NFPA No. 70,* Articles 500 and 501, Class I, Division 2.

3-1.3 Tanks.

3-1.3.1 Storage tanks, treatment tanks and filters shall comply with the requirements of 2-4 except that in drycleaning plants located in buildings with other occupancies or without sprinklers, each aboveground tank shall have a capacity of not more than 330 gallons, and the total solvent capacity of such plant, including inside aboveground and underground storage tanks, shall not exceed 1,320 gallons.

3-2 Class IIIB Cleaning Plants.

3-2.1 Scope.

3-2.1.1 Section 3-2 applies to cleaning plants or commercial laundries employing a cleaning system utilizing Class IIIB liquids.

3-2.1.2 Class IIIB Liquids used in these systems shall not be heated to a temperature in excess of 30°F below their flash point.

3-2.2 Location, Construction and Tanks.

3-2.2.1 Class IIIB plants located in a building with other occupancies shall be cut off vertically and horizontally from such other occupancies by partitions having a fire resistance rating of not less than two hours. All vertical and horizontal openings to other occupancies shall be protected by approved automatic fire doors suitable for Class B openings.

3-2.2.2 Electrical equipment and wiring in a Class IIIB plant shall comply with the provisions of the *National Electrical Code, NFPA No. 70*, for ordinary location.

3-2.2.3 Storage tanks, treatment tanks, and filters shall comply with the requirements of 2-4 except that the capacity of any inside aboveground tank shall not exceed 2,500 gallons, and the aggregate capacity of all inside aboveground storage and treatment tanks in an unenclosed area shall not exceed 7,500 gallons. Capacities in excess of 7,500 gallons shall be located in a separate room as required in 2-4.2.6.

Chapter IV

Class IV. Drycleaning Plants

4-1. Scope.

4-1.1 This chapter shall apply to drycleaning plants or systems utilizing approved Class IV solvents.

4-1.2 The provisions of this section apply to Class IV drycleaning plants and systems located in buildings with or without other occupancies, in which the drycleaning is not conducted by the public nor in coin-operated type equipment.

4-2. General Requirements.

4-2.1 Class IV plants shall be so designed, installed, and operated to reduce to a reasonable and acceptable degree the toxicity or health hazards incident to the nature of the solvents.

4-2.2 Special fire prevention regulations for control of the solvents are not required. Only solvents approved for Class IV installations shall be used in any drycleaning machine or system designed for such solvents. If other solvents are used in the machines, the plant status shall be changed to comply with the sections of these standards applicable to the rating of the most hazardous solvents used other than as permitted in 4-6.2.

4-3 Ventilation, Light, Power and Heat.

4-3.1 Class IV plants shall be provided with ventilation adequate to maintain an average solvent concentration anywhere within the plant of: For plants using perchlorethylene, not more than 100 ppm; for plants using fluorocarbon 113 (trichlorotrifluoroethane) not more than 1,000 ppm. Manually operated emergency ventilation for spills or leaks shall be installed to provide an air change every five minutes within 15 feet of Class IV equipment. The switch for this ventilation equipment shall be readily accessible and clearly identified.

4-3.2 All electrical equipment, devices and wiring for light and power shall be installed in accordance with the requirements of the *National Electrical Code* for general purpose use.

4-3.3 Air for combustion for gas- and oil-fired devices shall come through ducts from a clean source of air outside the building when such devices are located in the drycleaning room.

4-3.4 Apparatus with open flames or with exposed electric heating elements shall not be placed within 20 feet of any Class IV equipment unless such apparatus is located in a separate enclosed room or cabinet which is independently ventilated to prevent the air from the drycleaning system from being drawn towards the apparatus.

4-3.5 The exhaust ventilation outlets shall be located not closer than 25 feet from any openings in other occupancies.

4-4 Pumps and Piping.

4-4.1 The transfer or circulation of solvent shall be through closed circuit pipes. Except for gravity flow through pipes, pumps shall be used for the transfer of solvent.

4-4.2 Pipes, tubings, valves and sightglasses shall be of materials suitable for use with the solvent and shall be tested for minimum pressure of 50 percent in excess of the maximum operating pressure.

4-4.3 Flow and level sightglasses shall be reliably protected against physical damage.

4-4.4 All pumps shall be designed for the solvent being used and be provided with seals proven to be leakproof in solvent operation. Positive displacement pumps for solvent service shall be fitted with relief valves or bypasses set to prevent pressure in excess of the working pressure of the system.

4-5 Drycleaning Units, Filters, Stills and Reclaiming Tumblers.

4-5.1 All equipment of this class shall be in accordance with the following general requirements:

4-5.1.1 All solvent-handling equipment and components shall be constructed to prevent leakage.

4-5.1.2 Solvent storage and treatment tanks and all interior steel surfaces which tend to corrode when exposed during ordinary operation to solvent and to air alternately shall be protected against corrosion. Pumps, filters, or any closed containers which ordinarily are completely filled with solvent, or steam coils or chests immersed in solvent or which ordinarily do not tend to corrode, may be constructed of carbon steel without corrosion protection.