

NFPA 36

Standard for Solvent Extraction Plants

2004 Edition



NFPA, 1 Batterymarch Park, Quincy, MA 02169-7471
An International Codes and Standards Organization

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NFPA 36
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Solvent Extraction Plants
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This edition of NFPA 36, *Standard for Solvent Extraction Plants*, was prepared by the Technical Committee on Solvent Extraction Plants and acted on by NFPA at its November Association Technical Meeting held November 15–19, 2003, in Reno, NV. It was issued by the Standards Council on January 16, 2004, with an effective date of February 5, 2004, and supersedes all previous editions.

This edition of NFPA 36 was approved as an American National Standard on January 16, 2004.

Origin and Development of NFPA 36

This standard was developed at the request of the solvent extraction industry in an effort to achieve greater uniformity in fire protection practices for extraction plants. The purpose of this standard is to provide reasonable standards for the design and operation of solvent extraction processes and extraction plants.

In the development of this standard, the Technical Committee on Solvent Extraction Plants recognized some fundamental differences between the operation of solvent extraction plants and the processing of solvents in other facilities. Many extraction plants are relatively small units in isolated locations, operated without the benefit of overall fire protection measures, such as are customary in large solvent processing facilities.

The operator of a solvent extraction plant must establish and maintain fire safety esprit de corps among a small number of employees, as opposed to relying on the established customs of large-scale operations.

There are certain hazards in the combining and separating of solids and solvents that are peculiar to the solvent extraction industry. Also serving as a complicating problem is the potential dust explosion hazard in some areas of the typical plant. Therefore, the technical committee determined that it would be desirable to give consideration to practices applicable to either dust-laden or flammable vapor-laden atmospheres.

NFPA 36 was tentatively adopted at the 1957 Annual Meeting of the Association. A revision of this tentative edition was adopted at the 1958 Annual Meeting. NFPA 36 was officially adopted by the Association at its 1959 Annual Meeting. Amendments were adopted in 1962, 1964, 1967, 1972, 1973, 1974, 1978, 1983, 1985, 1988, 1993, 1997, 2001, and 2004.

This 2004 edition of NFPA 36 is a complete editorial rewrite of the previous edition to comply with NFPA's *Manual of Style* and also incorporates the following technical amendments:

- (1) Revised definitions of the terms Extraction Process, Flame Arrester, Flammable Liquid (to correlate with NFPA 30, *Flammable and Combustible Liquids Code*), Inert Gas, Lower Flammable Limit, and Upper Flammable Limit
- (2) Addition of a definition for Noncombustible Material, extracted from NFPA 220, *Standard on Types of Building Construction*
- (3) Revised procedures in 4.5.3 for transfer of solvent, to correlate with NFPA 30, *Flammable and Combustible Liquids Code*
- (4) Revision of 5.3.2 to require the design and construction of solvent storage tanks to comply with NFPA 30, *Flammable and Combustible Liquids Code*
- (5) Revision of Section 7.4, Drainage and Spill Control, to provide more specific design requirements for the separation sump
- (6) Addition of Figure 7.5.2 to illustrate typical locations for providing vent openings in the conveying system
- (7) Revision of Section 7.6, Cooling Towers, allowing flexibility in locating the various types of cooling towers relative to the extraction process
- (8) Addition of an exception to 8.2.6 that allows a shut-off valve in a normal vent line or an emergency vent line, if the shut-off valve meets specified criteria
- (9) Addition of physical property data for isohexane to Annex B to recognize its use as an extraction solvent

Technical Committee on Solvent Extraction Plants**Leroy Venne, Chair**

Cargill, Incorporated, MN [U]

Rep. Corn Refiners Association Inc.

George E. Anderson, Crown Iron Works Company, MN [M]**Richard H. Barton,** N. Hunt Moore & Associates, Inc., TN [SE]**Paul G. Dobbs,** Global Risk Consultants, MI [I]**Richard D. Farmer,** Bunge North America, MO [U]

Rep. International Oil Mill Superintendents Association

Jerry Fawbush, Central Soya Company, Inc., IN [U]

Rep. National Oilseed Processors Association

John E. Heilman, Heilman Consulting Group, CO [SE]**Timothy G. Kemper,** De Smet Process & Technology, Inc., GA [M]**C. L. Kingsbaker, Jr.,** Atlanta, GA [SE]**Eugene F. Smith,** Archer Daniels Midland Company, IL [U]

Rep. National Cottonseed Products Association

Leslie R. Watkins, Les Watkins & Associates, Inc., TX [SE]**Alternate****James M. Lay,** Bunge Milling Company, IL [U]

(Alt. to R. D. Farmer)

Robert P. Benedetti, NFPA Staff Liaison

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

Committee Scope: This Committee shall have primary responsibility for documents on safeguarding against the fire and explosion hazards associated with the design, construction, and operation of solvent extraction plants.

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NOTICE: An asterisk (*) following the number or letter designating a paragraph indicates that explanatory material on the paragraph can be found in Annex A.

Changes other than editorial are indicated by a vertical rule beside the paragraph, table, or figure in which the change occurred. These rules are included as an aid to the user in identifying changes from the previous edition. Where one or more complete paragraphs have been deleted, the deletion is indicated by a bullet (•) between the paragraphs that remain.

A reference in brackets [] following a section or paragraph indicates material that has been extracted from another NFPA document. As an aid to the user, Annex D lists the complete title and edition of the source documents for both mandatory and nonmandatory extracts. Editorial changes to extracted material consist of revising references to an appropriate division in this document or the inclusion of the document number with the division number when the reference is to the original document. Requests for interpretations or revisions of extracted text shall be sent to the technical committee responsible for the source document.

Information on referenced publications can be found in Chapter 2 and Annex D.

Chapter 1 Administration

1.1 Scope.

1.1.1* This standard shall apply to the commercial scale extraction processing of animal and vegetable oils and fats by the use of Class I flammable hydrocarbon liquids, hereinafter referred to as "solvents."

1.1.2 This standard shall also apply to any equipment and buildings that are located within 30 m (100 ft) of the extraction process.

1.1.3 This standard shall also apply to the unloading, storage, and handling of solvents, regardless of distance from the extraction process.

1.1.4 This standard shall also apply to the means by which material to be extracted is conveyed from the preparation process to the extraction process.

1.1.5 This standard shall also apply to the means by which extracted desolventized solids and oils are conveyed from the extraction process.

1.1.6 This standard shall also apply to preparation and meal finishing processes that are connected by conveyor to the extraction process, regardless of intervening distance.

1.1.7* This standard shall not apply to the storage of raw materials or finished products.

1.1.8 This standard shall not apply to extraction processes that use liquids that are miscible with water.

1.1.9 This standard shall not apply to extraction processes that use flammable gases, liquefied petroleum gases, or non-flammable gases.

1.1.10 This standard shall prohibit the use of processes that employ oxygen-active compounds that are heat or shock sensitive, such as certain organic peroxides, within the area defined in 1.1.2.

1.2 Purpose. The purpose of this standard shall be to provide the following:

- (1) Requirements for the design, construction, and operation of extraction processes that utilize Class I flammable hydrocarbon liquids
- (2) Requirements for the prevention of fire and explosion in extraction processes and in associated preparation and meal finishing areas
- (3) A means by which plant fire protection and supervisory personnel can evaluate the processes and operations under their control
- (4) Guidance to regulatory and inspection officials in determining whether a given facility is being operated in accordance with good practice
- (5) A workable set of standards for the use of design engineers, architects, and others in the planning and design of new installations

1.3 Application. (Reserved)

1.4 Retroactivity. The provisions of this standard reflect a consensus of what is necessary to provide an acceptable degree of protection from the hazards addressed in this standard at the time the standard was issued. Unless otherwise specified, the provisions of this standard shall not apply to facilities, equipment, structures, or installations that existed or were approved for construction or installation prior to the effective date of the standard. Where specified, the provisions of this standard shall be retroactive. In those cases where the authority having jurisdiction determines that the existing situation presents an unacceptable degree of risk, the authority having jurisdiction shall be permitted to apply retroactively any portions of this standard deemed appropriate. The retroactive requirements of this standard shall be permitted to be modified if their application clearly would be impractical in the judgment of the authority having jurisdiction, and only where it is clearly evident that a reasonable degree of safety is provided.

1.5 Equivalency. Nothing in this standard is intended to prevent the use of systems, methods, or devices of equivalent or superior quality, strength, fire resistance, effectiveness, durability, and safety over those prescribed by this standard. Technical documentation shall be submitted to the authority having jurisdiction to demonstrate equivalency. The system, method, or device shall be approved for the intended purpose by the authority having jurisdiction.

1.6 Units and Formulas.

1.6.1 The units of measurement for this standard shall be in accordance with the International System of Units (SI). Measurements and values shall be expressed using the SI unit of measurement. An equivalent inch/pound measurement or value, in parentheses, shall be permitted to follow the SI value.

Exception: Table 8.2.3 need not meet this requirement.

1.6.2 Where a measurement is given in an SI unit with an equivalent unit following in parentheses, the first stated value shall be regarded as the requirement and the value in parentheses shall be considered to be approximate.

1.7 Code Adoption Requirements. (Reserved)

Chapter 2 Referenced Publications

2.1 General. The documents or portions thereof listed in this chapter are referenced within this standard and shall be considered part of the requirements of this document.

2.2 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 30, *Flammable and Combustible Liquids Code*, 2003 edition.

NFPA 69, *Standard on Explosion Prevention Systems*, 2002 edition.

NFPA 70, *National Electrical Code*®, 2002 edition.

NFPA 214, *Standard on Water-Cooling Towers*, 2000 edition.

NFPA 220, *Standard on Types of Building Construction*, 1999 edition.

NFPA 780, *Standard for the Installation of Lightning Protection Systems*, 2000 edition.

2.3 Other Publications.

2.3.1 ASME Publication. American Society of Mechanical Engineers, Three Park Avenue, New York, NY 10016-5990.

ASME *Boiler and Pressure Vessel Code*.

2.3.2 ASTM Publications. American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM D 323, *Standard Method of Test for Vapor Pressure of Petroleum Products (Reid Method)*, 1999.

ASTM E 136, *Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C*, 1999.

Chapter 3 Definitions

3.1 General. The definitions contained in this chapter shall apply to the terms used in this standard. Where terms are not included, common usage of the terms shall apply.

3.2 NFPA Official Definitions.

3.2.1* Approved. Acceptable to the authority having jurisdiction.

3.2.2* Authority Having Jurisdiction (AHJ). An organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure.

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

3.2.4* Listed. Equipment, materials, or services included in a list published by an organization that is acceptable to the authority having jurisdiction and concerned with evaluation of products or services, that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services, and whose listing states that either the equipment, material, or service meets appropriate designated standards or has been tested and found suitable for a specified purpose.

3.3 General Definitions.

3.3.1 Condensate. Any material that has been condensed from the vapor state to the liquid state.

3.3.2 Condenser. A piece of equipment that lowers the temperature of a vapor to the point where it changes to a liquid.

3.3.3 Controlled Area. Any area that is more than 15 m (50 ft) but less than 30 m (100 ft) from the solvent extraction process, measured horizontally.

3.3.4 Conveyor. Equipment that transports material from one point to another either pneumatically or mechanically, by means of a moving belt, a chain, buckets, or flights.

3.3.5 Desolventized Material. Material from which all absorbed solvent has been removed.

3.3.6 Desolventizer. Equipment that removes the absorbed solvent from the material being processed.

3.3.7 Evaporator. Equipment that vaporizes the solvent from the oil-bearing miscella.

3.3.8 Extraction Process. The curbed area that contains the operations involving the extractor and the desolventizer, together with pertinent equipment such as heat exchangers, evaporators, and strippers, and which are contained in an enclosed building or in an open structure.

3.3.9 Extractor. Equipment that removes oil and fat from oil- or fat-bearing material by means of a suitable solvent.

3.3.10 Flakes. Oil- or fat-bearing material that has been rolled in preparation for the extraction process.

3.3.11 Flaking Mill. A piece of equipment that utilizes smooth rollers to prepare material for the extraction process.

3.3.12 Flame Arrester. A device that prevents the transmission of a flame through a flammable gas/air mixture by quenching the flame on the surfaces of an array of small passages through which the flame must pass. The emerging gases are sufficiently cooled to prevent ignition on the protected side. [69:3.3]

3.3.13 Flammable Liquid (Class I Liquid). Any liquid that has a closed-cup flash point below 37.8°C (100°F), as determined by the test procedures and apparatus set forth in Chapter 4 of NFPA 30, *Flammable and Combustible Liquids Code*, and a Reid vapor pressure not exceeding 2068.6 mm Hg (40 psia) at 37.8°C (100°F), as determined by ASTM D 323, *Standard Method of Test for Vapor Pressure of Petroleum Products (Reid Method)*. [30:1.7]

3.3.14 Heat Exchanger. Equipment that transfers heat from one vapor or liquid to another vapor or liquid.

3.3.15 Hydrocarbon. A chemical substance consisting of only hydrogen and carbon atoms.

3.3.16* Important Building. A building that is considered not expendable in an exposure fire. [30:3.3]

3.3.17 Inert Gas. A gas that is noncombustible and nonreactive. [69:3.3]

3.3.18 Inerting. A technique by which a combustible mixture is rendered nonignitable by adding an inert gas. [69:3.3]

3.3.19* Lower Flammable Limit (LFL). That concentration of a combustible material in air below which ignition will not occur. [329:1.2]

3.3.20* Meal Finishing Area. The area that contains the equipment needed to prepare the extracted and desolventized material for storage.

3.3.21 Miscella. A mixture, in any proportion, of extracted oil or fat and the extracting solvent.

3.3.22 Noncombustible Material. A material that, in the form in which it is used and under the conditions anticipated, will not ignite, burn, support combustion, or release flammable vapors when subjected to fire or heat. Materials that are reported as passing ASTM E 136, *Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C*, shall be considered noncombustible materials. [220:2.1]

3.3.23 Preparation Process. The operations involving the equipment used for the preparation of the material for the extraction process.

3.3.24 Purging. The process of displacing flammable vapors from buildings, equipment, or piping.

3.3.25 Restricted Area. The area within 15 m (50 ft) horizontally of the extraction process.

3.3.26 Separation Sump. A containment basin that is used to separate oils, miscella, or solvent from water by means of the immiscibility of the liquids and their differing densities.

3.3.27 Solvent. Any Class I flammable hydrocarbon liquid that has the ability to extract oils or fats from animal or vegetable material.

3.3.28* Spent Material. Material from which the oil or fat has been extracted but which has not been desolventized.

3.3.29 Stripper. A distillation column or tower, usually operated under vacuum, that is used to remove residual solvent from the extracted oil or fat.

3.3.30 Toaster. Equipment that is capable of producing the desired cooking, toasting, and modification of protein by means of heat and moisture.

3.3.31* Upper Flammable Limit (UFL). That concentration of a combustible material in air above which ignition will not occur.

3.3.32 Vapor Recovery. The process of reclaiming solvent by means of condensation or absorption.

3.3.33 Vapor Scrubber. A device used to wash entrained dust from a vapor stream by means of a liquid spray.

3.3.34 Vapor Seal. Equipment or material that prevents the escape of solvent vapors from process equipment or conveyors.

Chapter 4 General Requirements

4.1 Scope. This chapter shall apply to the general operation of solvent extraction plants. The provisions of this chapter shall apply to all buildings, equipment, and operations in solvent extraction plants.

Exception: As otherwise provided for in Chapters 5, 6, and 7 of this standard.

4.2 Basic Operating Requirements.

4.2.1 Safe operating practices, including but not limited to start-up and shutdown procedures, shall be the responsibility of the management operating the extraction plant.

4.2.2 Operating and maintenance employees shall be instructed in plant operations in general.

4.2.3* Applicable plant regulations shall apply to all visitors and others who enter the plant, both during operating periods and during shutdown periods.

4.2.4* Repair Authorization. When it is necessary to make repairs to the areas covered by this standard, the work shall be authorized by the individual in responsible charge of the plant before the work is started. Where hot work is required, this authorization shall be in writing.

4.3 Sources of Ignition.

4.3.1 Electrical installations shall meet all applicable requirements of NFPA 70, *National Electrical Code*.

4.3.2 Provisions shall be made for protection against static electricity and lightning as required in other chapters of this standard.

4.3.3 Smoking. Smoking or other sources of ignition shall not be permitted within the restricted and controlled areas. Lighters and matches shall not be carried into the restricted or controlled areas of the extraction plant.

4.3.4 Powered vehicles, unless approved for such locations, shall be prohibited within the controlled or restricted area except by special permission of the individual in responsible charge of the plant.

4.4 Housekeeping.

4.4.1 Flammable liquids not contained in process equipment shall not be stored in the extraction process area except in small quantities, which shall be stored in approved safety cans.

4.4.2 Waste materials, such as oily rags, other wastes, and absorbents used to wipe up solvent, paints, and oils, shall be deposited in approved waste cans and removed from the premises not less than once each day.

4.4.3 Dust originating from material in process shall be kept to a minimum.

4.4.4 The space within the restricted and controlled areas shall be kept free of dry grass, weeds, trash, and all combustible materials, except as allowed for cooling towers in Section 7.6.

4.4.5 Any spills of oil, solvent, or deposits of solvent-bearing material shall be cleaned up immediately and removed to a safe place.

4.4.6 The discharge or removal of solvent-bearing material shall be recognized as a severe hazard, and operating procedures shall be established to minimize such occurrences.

4.5 Solvent Transfer Equipment.

4.5.1 Pumps shall be designed for the solvent, the working pressures, and the structural stresses to which they will be subjected.

4.5.2 Positive displacement pumps shall be provided with bypasses with pressure relief valves discharging back to the tank or to the pump suction.

4.5.3 Transfer of liquids among vessels, containers, tanks, and piping systems by means of air or inert gas pressure shall be permitted only under all of the following conditions:

- (1) The vessels, containers, tanks, and piping systems shall be designed for such pressurized transfer and shall be capable of withstanding the anticipated operating pressure.
- (2) Safety and operating controls, including pressure relief devices, shall be provided to prevent overpressure of any part of the system.
- (3) Only inert gas shall be used to transfer Class I solvents.

4.5.4 Where practicable, all pumps handling solvent in the processing equipment shall be located on the first floor level.

4.5.5 Pump houses, if used, shall be of noncombustible construction and ventilated.

4.6 Piping, Valves, and Fittings.

4.6.1 General. All piping, valves, and fittings shall be designed for the working pressures and structural stresses to which they will be subjected and shall be of steel or other material approved for the service intended.

4.6.2 Pipe Systems. Pipe systems shall be substantially supported and protected against physical damage caused by expansion, contraction, and vibration.

4.6.3 Process Piping.

4.6.3.1 Piping shall be pitched to drain to avoid trapped liquids, or suitable drains shall be provided.

4.6.3.2 Armored hose shall be permitted to be used where vibration exists or where frequent movement is necessary.

4.6.3.3 Aboveground solvent pipe sections 50 mm (2 in.) in size or over shall be welded and flanged. Welding shall conform to good welding practice.

4.6.4 Drain Valves. Drain valves shall be provided with plugs to prevent leakage.

4.6.5 Pipe Connections. Pipe connections 50 mm (2 in.) and larger to all tanks and vessels shall be bolted flanges that can be opened and blanked off.

4.6.6 Testing. After installation and before covering or painting, all piping systems, including suction lines, shall be pressure tested to not less than 1½ times the working pressure, but not less than a gauge pressure of 35 kPa (5 psig) at the highest point in the system. Tests shall continue for not less than 30 minutes without any noticeable drop in pressure.

Exception: Vapor lines operating at less than 500 mm (20 in.) of water column need not comply with these requirements.

4.6.7 Identification of Piping and Equipment. All piping and equipment shall be coded for identification.

4.7 Exits.

4.7.1 An extraction building or open process structure over two stories in height shall be provided with at least two remotely located means of egress from each floor, one of which shall be enclosed or separated from the process by a wall that is blank except for doors.

4.7.2 The enclosure or separating wall shall be of masonry or other noncombustible construction.

4.7.3 Self-closing, noncombustible doors, normally kept closed, shall be provided for access to the means of egress.

4.8* Fire Protection.

4.8.1* An approved water spray, deluge, or foam-water system, or a combination of these types of fixed protection systems, shall be provided to protect the extraction process equipment and structure.

4.8.2* An approved system of automatic sprinklers shall be provided in the preparation area.

4.8.3* A system of yard hydrants shall be provided in accordance with accepted good practice.

4.8.4* Approved portable fire extinguishers of appropriate size and type shall be provided.

4.8.5* Where standpipe and hose protection is installed, combination water fog and straight stream nozzles shall be provided.

4.8.6 Where explosion prevention systems are used, they shall be installed in accordance with the provisions of NFPA 69, *Standard on Explosion Prevention Systems*.

4.8.7 Fire alarm signals shall be relayed or sent to a constantly supervised point on or off the premises.

4.8.8 Where service is available, a public fire alarm box shall be located nearby.

4.9 Start-Up of Extraction Process. Procedures for extractor start-up shall be established to minimize the hazards resulting from passing through the flammable range. Inerting shall be permitted to be used to reduce the oxygen content and meet this requirement.

4.10 Emergency Procedures.

4.10.1 All employees shall be trained in the necessary actions to be taken in time of emergency, including emergency shut-down procedures.

4.10.2 Personnel shall be trained as to the location of exits.

4.10.3 All personnel shall be trained in the use and limitations of each type of fire-fighting equipment on the premises, including control valves for the water spray systems.

4.10.4 A fire brigade, if established, shall be composed of selected personnel on each shift and shall be trained as a unit with each person assigned definite responsibilities in case of an emergency.

4.10.5 Periodic drills shall be held to ensure that employees can carry out the procedures in 4.10.1 through 4.10.4.

4.10.6 Emergency safety devices or systems provided in the plant shall be periodically tested in accordance with established procedures and a record made thereof.

4.11 Repairs in Restricted and Controlled Areas When Plant Is Operating or Not Purged.

4.11.1 Power Tools. Maintenance operations involving the use of power tools that can produce sources of ignition shall be prohibited except as provided for in Sections 6.7 and 6.8.

4.11.2 Electrical Equipment. Repairs on live electrical wiring or equipment shall be prohibited. If it is necessary to replace or repair electrical wiring or equipment, the power shall be disconnected completely, and the switch shall be locked in an open position.

4.11.3 Welding and Cutting Operations. Welding and cutting, including brazing and soldering operations, shall be prohibited except as provided for in Sections 6.7 and 6.8.

4.12 Repairs in Restricted and Controlled Areas When Plant Is Shut Down and Purged.

4.12.1* Repairs or alterations to equipment or buildings that can produce ignition sources shall be performed only when the plant has been shut down and completely purged and has been declared safe by the individual in responsible charge.

4.12.2 Before purging is initiated, the following steps shall be taken:

- (1) Tanks, vessels, piping, and traps shall be emptied of all materials. All such material shall be removed to a safe location.
- (2) All piping and other connections to storage facilities shall be disconnected, plugged, or blanked off.

4.12.3 Purging shall be accomplished by one or more of the methods in 4.12.3.1 through 4.12.3.3.

4.12.3.1 Steam. Vapor freeing shall be permitted to be accomplished by the introduction of steam into the equipment. All of the following requirements shall be met:

- (1) The equipment shall be adequately vented to prevent damage from excessive pressure or vacuum.
- (2) Steam supply lines shall be bonded to the equipment.
- (3) The rate of supply of steam shall exceed the rate of condensation so that the equipment is heated close to the boiling point of water.
- (4) The equipment shall be steamed long enough to vaporize the residues from all portions.
- (5) After steaming, the procedures outlined in 4.12.3.2 shall be followed when hot work is to be performed.

4.12.3.2 Purging with Air. Vapor freeing shall be permitted to be accomplished by purging with air. Continued purging shall be permitted to maintain a safe atmosphere. All of the following requirements shall be met:

- (1) Where fixed ventilating equipment is not provided, air movers shall be permitted to be attached so that air is drawn in and discharged through the air mover, or air can be introduced through the air mover and discharged through another opening.
- (2) Discharge shall be to a safe location.
- (3) Air movers shall be approved for the locations in which they are used.
- (4)*Precautions shall be taken to ensure that the air mover is bonded to the equipment to minimize the hazard of ignition by static electricity. (See also 7.9.5.)

4.12.3.3* Purging with Inert Gas. Vapor freeing shall be permitted to be accomplished by purging with inert gas and then ventilating with air.

4.12.4 To ensure a safe condition, even on units out of service, tests for the presence of flammable vapors shall be made with a combustible gas indicator under each of the following conditions:

- (1) Before commencing alterations or repairs, including welding, cutting, or heating operations
- (2) Immediately after starting any welding, cutting, or heating operations
- (3) Frequently during the course of such work

4.12.4.1 All such work shall be stopped immediately when the presence of flammable vapor is indicated.

4.12.4.2 The source of the vapor release shall be located and removed, and the tests required by 4.12.4 shall be repeated before the work is recommenced.

4.12.5 Upon completion of repairs or alterations, the plant shall be checked by the individual in responsible charge to ensure that operations can be resumed safely. (See Section 4.9.)

Chapter 5 Bulk Solvent Unloading and Storage

5.1 Scope. This chapter shall apply to facilities for bulk unloading, bulk handling, and bulk storage of Class I flammable liquid solvent, as defined in this standard.

5.2 Location and Siting.

5.2.1 Unloading Site.

5.2.1.1 Bulk solvent unloading facilities shall be located so that ignition sources presented by locomotives or tank vehicles are at least 30 m (100 ft) from the extraction process and at least 7.5 m (25 ft) from any building or any property line that is or can be built on.

5.2.1.2 The fill connection to the storage tank shall be at least 7.5 m (25 ft) from the extraction process.

5.2.2 Bulk Solvent Storage Tanks.

5.2.2.1 Bulk solvent storage tanks shall be located outside of any building.

5.2.2.2 Underground solvent storage tanks shall be located at least 0.3 m (1 ft) from any building foundation or support and at least 0.9 m (3 ft) from the nearest property line that is or can be built on. The loads carried by the building foundations or supports shall not be transmitted to the tanks.

5.2.2.3 Aboveground solvent storage tanks shall be located in accordance with the following:

- (1) Within the restricted area, at least 7.5 m (25 ft) from the extraction process and at least 7.5 m (25 ft) from any important building
- (2) Within the controlled area, at least 7.5 m (25 ft) from any important building and at least 7.5 m (25 ft) from any property line that is or can be built on
- (3) Outside the controlled area, at least 7.5 m (25 ft) from any important building and at least 7.5 m (25 ft) from any property line that is or can be built on

5.2.2.4 Aboveground storage tanks shall be enclosed by the fence already provided for in the restricted area or by a separate fence.

5.3 Design and Construction.

5.3.1 Unloading Stations. Unloading structures and platforms shall be constructed of noncombustible material and shall be designed and installed in accordance with accepted practice.

5.3.2* Storage Tanks. Storage tanks shall be designed, constructed, installed, and tested in accordance with NFPA 30, *Flammable and Combustible Liquids Code*.

5.4 Fire Protection Equipment.

5.4.1* Approved portable fire extinguishers of appropriate size and type shall be provided.

5.4.2 Additional fire protection for the unloading structure and bulk storage tanks shall be provided where an exposure hazard exists.