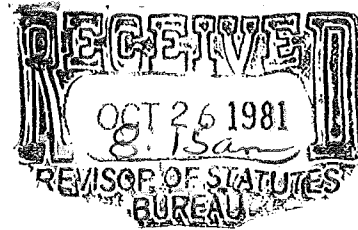


RULES CERTIFICATE

STATE OF WISCONSIN)
) SS
DEPT. OF INDUSTRY,)
LABOR & HUMAN RELATIONS)



TO ALL TO WHOM THESE PRESENTS SHALL COME, GREETINGS:

I, Lowell B. Jackson, Secretary of the Department of Industry, Labor and Human Relations, and custodian of the official records of said department, do hereby certify that the annexed rule(s) relating to

Ch. Ind 8 - Flammable and Combustible Liquids were duly
(Subject)
approved and adopted by this department on October 22, 1981.
(Date)

I further certify that said copy has been compared by me with the original on file in this department and that the same is a true copy thereof, and of the whole of such original.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the official seal of the department at our offices in the city of Madison, this 22nd day of October A.D. 19 81.

Lowell B. Jackson
Secretary

ORDER OF ADOPTION

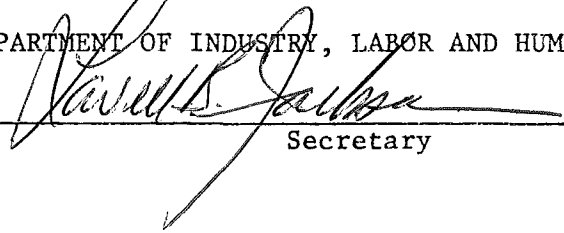
Pursuant to authority vested in the Department of Industry, Labor and Human Relations by section(s) 101.02(1), 101.02(15), Stats., the Department of Industry, Labor and Human Relations hereby creates; amends; repeals and recreates; and repeals and adopts rules of Wisconsin Administrative Code chapter(s):

Ind. 8 Flammable & Combustible Liquids
(Number) (Title)

The attached rules shall take effect on the first day following publication in the Wisconsin Administrative Register, pursuant to section 227.026, Stats.

Adopted at Madison, Wisconsin, this 22nd day of October, A.D., 1981.

DEPARTMENT OF INDUSTRY, LABOR AND HUMAN RELATIONS


Secretary



RULES in FINAL DRAFT FORM

Rule: CHAPTER IND 8
Relating to: FLAMMABLE AND COMBUSTIBLE LIQUIDS

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Appendix

SECTION 1. Chapter Ind 8 is repealed and recreated to read:

Note: Chapter Ind 8 as it existed on _____ was repealed and a new chapter Ind 8 was created effective _____.

SUBCHAPTER 1

SCOPE, APPLICATION, DEFINITIONS AND ADOPTED STANDARDS

Ind 8.001 SCOPE. All persons, firms, corporations, copartnerships, voluntary associations and governmental agencies except federal, storing, handling or using flammable or combustible liquids shall be subject to the provisions of this chapter.

* * * * *

SPECIAL NOTE #1

Many of the requirements of this chapter are based upon the National Fire Protection Association Standard NFPA No. 30-1981 - Flammable and Combustible Liquids Code. Subchapters 4 through 11 have a similar format to that of NFPA No. 30. Requirements taken from or based upon NFPA No. 30 are identified by the corresponding NFPA rule number appearing in brackets prior to the text of the rule. See s. Ind 8.15 (8) for example.

SPECIAL NOTE #2

The Wisconsin Department of Natural Resources enforces administrative rules, which also pertain to topics relating to flammable and combustible liquids not addressed in this chapter. These topics include hydrocarbon emissions, ground water contamination, spills of hazardous materials and others. Users of this code should consult the administrative rules of the Wisconsin Department of Natural Resources for further requirements.

* * * * *

Ind 8.002 APPLICATION. (1) GENERAL. The provisions of this chapter shall apply to the following:

(a) Flammable and combustible liquids with a flash point below 200 degrees F.

Note: There are many liquids which have a flash point above 200 degrees F. and are accordingly exempt from this chapter. Such liquids, however, involve some degree of hazard, which may be controlled by application of certain provisions of this chapter, with appropriate modifications.

(b) Flammable and combustible liquids with a flash point above 200 degrees F. which assume the characteristics of lower flash liquids, when heated.

(c) Oil fired stationary and portable oil burning equipment installations, except internal combustion engines, oil lamps and portable devices such as blow torches, melting pots and wood burners.

(d) Operations in which articles or materials are passed through contents of tanks, vats or containers of flammable or combustible liquids, including coating, finishing, treating and similar processes.

(e) Facilities and processes used for the manufacture of protective and decorative finishes or coatings for industrial, automotive, marine, transportation, institutional, household and other purposes.

(f) Organic coating manufacturing facilities involving flammable and combustible liquids.

(g) Tank vehicles used for the transportation of asphalt or normally stable flammable and combustible liquids with a flash point below 200 degrees F.

(h) Experimental, research and other laboratories where toxic, corrosive or otherwise hazardous chemicals are used.

(2) EXEMPTIONS. The provisions of this chapter do not apply to the following:

(a) Transportation of flammable or combustible liquids in bulk.

(b) Transportation of flammable or combustible liquids which is in conformance with regulations of or on file with the U.S. Department of Transportation (formerly I.C.C.).

(c) Oil burning equipment except as specifically provided for in the rules.

(d) Liquids without flash points that may be flammable under some conditions, such as certain halogenated hydrocarbons and mixtures containing halogenated hydrocarbons.

(e) Mists, sprays or foams, except flammable aerosols in containers.

(f) Flammable and combustible liquids that are solid at 100 degrees F. or above.

(3) APPLICATION OF RULES. The provisions of this chapter shall apply to all plants, stations, establishments and facilities where flammable and combustible liquids are stored, handled or used, whether existing and in service prior to the effective date of this chapter or subsequently established or placed in service.

(a) The rules covering physical installations shall apply to all plants, stations, establishments and facilities erected or installed or first devoted to flammable or combustible liquid storage, handling or use on or after the effective date of this chapter.

(b) The rules covering physical installations shall apply to all plants, stations, establishments and facilities existing or devoted to the storage, handling or use of flammable or combustible liquids prior to the effective date of this chapter to the extent necessary to eliminate any distinct hazard to life or adjoining property.

1. Violation of rules pertaining to vents or pressure relief devices on tanks, control valves on tanks or in piping systems, ventilation and sources of ignition shall be deemed distinctly hazardous and shall be corrected or eliminated.

2. Vents or pressure relief devices on tanks prior to the effective date of this chapter and meeting the size requirements of ch. Ind 8 effective February, 1962, may be allowed to continue.

(c) At any plant, station or establishment existing and devoted to flammable or combustible liquid use as of the effective date of this chapter, existing nonconformity and continuance of which is allowed by this chapter shall not prevent the installation of additional or replacement facilities provided such additional or replacement facilities comply with the requirements of this chapter.

(d) The owner of an existing plant, station, establishment or facility with a possible distinct hazard nonconformance shall be given an opportunity to be heard prior to the department's determination. A 10 day written notice of time and location of such hearing shall be sent to the affected individual and due consideration shall be given to all existing protection and fire safety devices and to their effect on the nonconformance.

(e) Where required correction or elimination of existing nonconformity necessitates the obtaining and installation of additional devices or structural protection or the emptying or temporary nonuse of one or more facilities, a reasonable time, considering the amount of work to be done, the availability of materials, and the need for continued operation of the facility, shall be allowed.

(f) Reconstruction or modernization of storage facilities shall include correction or elimination of any distinct hazard nonconformance affected by such work.

(g) Where practical difficulties are encountered in accomplishing required correction or elimination of nonconformity, an extension or further extension beyond the time specified in any order will be considered by the department upon receipt of written application which set forth supporting facts.

Ind 8.003 DEFINITIONS. As used in this chapter, the following terms are defined to be:

(1) "Aerosol" means a material which is dispensed from its container as a mist, spray or foam by a propellant under pressure.

(2) "Antiflooding device" means a primary safety control which causes the flow of fuel to be shut off upon a rise in fuel level or upon receiving excess fuel, and which operates before the hazardous discharge of fuel can occur.

(3) "Approved" means being acceptable to the department.

(4) "Atmospheric tank" means a storage tank which has been designed to operate at pressures from atmospheric through 0.5 psig.

(5) "Authority having jurisdiction" means the department or its authorized deputies responsible for approving equipment, installations or procedures.

(6) "Automotive service station" means that portion of property where liquids used as motor fuels are stored and dispensed from fixed equipment into the fuel tanks of motor vehicles and includes any facilities available for the sale and service of tires, batteries and accessories, and for minor automotive maintenance work. Major automotive repairs, painting, body and fender work are excluded.

(7) "Baffle" means a nonliquidtight transverse partition in a cargo tank.

(8) "Basement level" means that level of a building below the first or lowest ground floor level with its entire floor below the exit discharge grade.

(9) "Barrel" means a volume of 42 U.S. gallons.

(10) "Boil over" means the expulsion of crude oil or certain other liquids from a burning tank. The light fractions of the crude oil burn off producing a heat wave in the residue, which on reaching a water strata may result in the expulsion of a portion of the contents of the tank in the form of froth.

(11) "Boiling point" means the boiling point of a liquid at a pressure of 14.7 psia. Where an accurate boiling point is unavailable for the material in question, or for mixtures which do not have a constant boiling point, the 10 percent point of a distillation performed in accordance with nationally recognized standards may be used as the boiling point of the liquid.

(12) "Bulk plant" means that portion of a property where liquids are received by tank vessel, pipe lines, tank car, or tank vehicle, and are stored or blended in bulk for the purpose of distributing such liquids by tank vessel, pipe line, tank car, tank vehicle, portable tank or container.

(13) "Bulkhead" means a liquidtight transverse closure between compartments of a cargo tank.

(14) "Cargo tank" means any container or aggregate quantity of containers having a liquid capacity in excess of 200 gallons, used for the carrying of flammable or combustible liquids or asphalt and mounted permanently or otherwise upon a tank vehicle. The term "cargo tank" does not apply to any container used solely for the purpose of supplying fuel for the propulsion of the tank vehicle upon which it is mounted.

(15) "Centralized oil distribution system" means a system of piping through which oil is supplied from a separate central supply tank or tanks to more than one building, mobile home, recreational vehicle or other structure.

(16) "Chemical plant" means a large integrated plant or that portion of such a plant other than a refinery or distillery where liquids are produced by chemical reactions or used in chemical reactions.

(17) "Closed container" means a container so sealed by means of a lid or other device that neither liquid nor vapor will escape from it at ordinary temperatures.

(18) "Collection sump" means a sump as defined in s. Ind 8.21.

(19) "Combustible liquid" means a liquid having a flash point at or above 100 degrees F. Combustible liquids are subdivided as follows:

(a) Class II liquids include those having flash points at or above 100 degrees F. and below 140 degrees F.

(b) Class IIIA liquids include those having flash points at or above 140 degrees F. and below 200 degrees F.

(c) Class IIIB liquids include those having flash points at or above 200 degrees F. This chapter does not cover Class IIIB liquids. Where the terms "Combustible Liquids" or "Class III Liquids" are used in this chapter they mean Class IIIA liquids only.

Note: The upper limit of 200 degrees F. is given because the application of this chapter does not extend to liquids having flash points above 200 degrees F. and this limitation should not be construed as indicating that liquids with higher flash points are noncombustible.

(20) "Combustible material" means material made of or surfaced with wood, compressed paper, plant fibers, plastics, or other material that will ignite and burn, whether flameproofed or not, or whether plastered or unplastered.

(21) "Compartment" means a liquidtight division in a cargo tank.

(22) "Constant-level valve" means a device for maintaining within a reservoir a constant level of oil fuel for delivery to an oil burner.

(23) "Container" means any vessel of 60 U.S. gallons or less capacity used for transporting or storing liquids.

(24) "Contractor or farm fuel tanks" means tanks having a total aggregate capacity not greater than 200 gallons mounted on a pick-up truck or similar vehicle and constructed to conform to the design of that vehicle.

(25) "Crude petroleum" means a hydrocarbon mixture that has a flash point below 150 degrees F. and which has not been processed in a refinery.

(26) "Department" means the department of industry, labor and human relations, unless otherwise specified.

(27) "Dip tank" means a tank, vat or container of flammable or combustible liquid in which articles or materials are immersed for the purpose of coating, finishing, treating or similar processes.

(28) "Distillery" means a plant or that portion of a plant where liquids produced by fermentation are concentrated, and where the concentrated products may also be mixed, stored, or packaged.

(29) "Dwelling" means a building occupied exclusively for residence purposes and having not more than two dwelling units or as a boarding or rooming house serving not more than 15 persons with meals or sleeping accommodations or both.

(30) "Dwelling unit" means one or more rooms arranged for the use of one or more individuals living together as a single housekeeping unit, with cooking, living, sanitary and sleeping facilities.

(31) "Explosive material" means a chemical compound, mixture or device, the primary or common purpose of which is to function by explosion.

(32) "Fire area" means an area of a building separated from the remainder of the building by construction having a fire resistance of at least one hour and having all communicating openings properly protected by an assembly having a fire resistance rating of at least 3/4 hour.

(33) "Fire point ignition temperature" means the lowest temperature of a liquid in an open container at which vapors are evolved fast enough to support continuous combustion.

(34) "Fire wall" means a wall constructed of solid masonry units, or of hollow masonry units faced on each side with brick, or reinforced concrete. They are used to subdivide a building or separate buildings to restrict the spread of fire. The wall starts at the foundation and extends continuously, through all stories to and above the roof, except where the roof is of fire-resistant or semi-fire-resistant construction and the wall is carried up tightly against the underside of the roof slab.

(35) "Flammable aerosol" means an aerosol which is required to be labeled "Flammable" under the U.S. Federal Hazardous Substances Labeling Act.

(36) "Flammable gas" means a gas that will burn in the normal concentration of oxygen in air.

(37) "Flammable liquid" means a liquid having a flash point below 100 degrees F. and having a vapor pressure not exceeding 40 pounds per square inch (absolute) at 100 degrees F. and is known as a Class I liquid. The volatility of liquids is increased when artificially heated to temperatures equal to or higher than their flash points. When so heated Class II and III liquids are subject to the applicable requirements for Class I or II liquids. This chapter may also be applied to high flash point liquids when so heated even though these same liquids when not heated are outside of its scope. Class I liquids are subdivided as follows:

(a) Class IA includes those liquids having flash points below 73 degrees F. and having a boiling point below 100 degrees F.

(b) Class IB includes those liquids having flash points below 73 degrees F. and having a boiling point at or above 100 degrees F.

(c) Class IC includes those liquids having flash points at or above 73 degrees F. and below 100 degrees F.

(38) "Flash point" means the minimum temperature at which a flammable or combustible liquid will give off sufficient flammable vapors to form an ignitable mixture with air near the surface of the liquid or within the vessel.

(39) "Fuel oil" means any hydrocarbon oil as specified by a nationally recommended standard and having a flash point not less than 100 degrees F.

(40) "Gallon" means a U.S. gallon with approximate or accepted Imperial gallon equivalent given in parenthesis.

(41) "General purpose warehouse" means a separate, detached building or portion of a building used only for warehousing type operations.

(42) "Gravity tank" means a supply tank from which the oil is delivered directly to the burner by gravity.

(43) "Hazardous chemical" means a chemical with one or more of the following ratings:

(a) Health 4. Materials which on very short exposure could cause death or major residual injury even though prompt medical treatment were given, including those which are too dangerous to be approached without specialized protective equipment. This degree includes:

1. Materials which can penetrate ordinary rubber protective clothing; and
2. Materials which under normal conditions or under fire conditions give off gases which are extremely toxic, corrosive or hazardous through inhalation or through contact with or absorption through the skin.

(b) Health 3. Materials which on short exposure could cause serious temporary or residual injury even though prompt medical treatment were given, including those requiring protection from all bodily contact. This degree includes:

1. Materials giving off highly toxic combustion products; and
2. Materials corrosive to living tissue or toxic by skin absorption.

(c) Health 2. Materials which on intense or continued exposure could cause temporary incapacitation or possible residual injury unless prompt medical treatment is given, including those requiring use of respiratory protective equipment with independent air supply. This degree includes:

1. Materials giving off basic toxic combustion products;
2. Materials giving off highly irritating combustion products; and

3. Materials which either under normal conditions or under fire conditions give off toxic vapors lacking warning properties.

(d) Flammability 4. 1. Materials which will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature or which are readily dispersed in air, and which will burn readily. This degree includes:

- a. Gases; and
- b. Cryogenic materials.

2. Any liquid or gaseous material which is a liquid while under pressure and having a flash point below 73 degrees F. and having a boiling point below 100 degrees F.

3. Materials which on account of their physical form or environmental conditions can form explosive mixtures with air and which are readily dispersed in air, such as dusts of combustible solids and mists of flammable or combustible liquid droplets.

(e) Flammability 3. Liquids and solids that can be ignited under almost all ambient temperature conditions. Materials in this degree produce hazardous atmospheres with air under almost all ambient temperatures or, though unaffected by ambient temperatures, are readily ignited under almost all conditions. This degree includes:

1. Liquids having a flash point below 73 degrees F. and having a boiling point at or above 100 degrees F. and those liquids having a flash point at or above 73 degrees F. and below 100 degrees F.;

2. Solid materials in the form of coarse dusts which may burn rapidly but which generally do not form explosive atmospheres with air;

3. Solid materials in a fibrous or shredded form which may burn rapidly and create flash fire hazards, such as cotton, sisal and hemp;

4. Materials which burn with extreme rapidity, usually, by reason of self-contained oxygen, such as but not limited to dry nitrocellulose and many organic peroxides; and

5. Materials which ignite spontaneously when exposed to air.

(f) Flammability 2. Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur. Materials in this degree would not under normal conditions form hazardous atmospheres with air, but under high ambient temperatures or under moderate heating may release vapor in sufficient quantities to produce hazardous atmospheres with air. This degree includes:

1. Liquids having a flash point above 100 degrees F. but not exceeding 200 degrees F.; and

2. Solids and semi-solids which readily give off flammable vapors.

(g) Reactivity 4. Materials which in themselves are readily capable of detonation or of explosive decomposition or explosive reaction at normal temperatures and pressures. This degree includes materials which are sensitive to mechanical or localized thermal shock at normal temperatures and pressures.

(h) Reactivity 3. Materials which in themselves are capable of detonation or of explosive decomposition or explosive reaction but which require a strong initiating source or which must be heated under confinement before ignition. This degree includes materials which are sensitive to thermal or mechanical shock at elevated temperatures and pressures or which react explosively with water without requiring heat or confinement.

(i) Reactivity 2. Materials which in themselves are normally unstable and readily undergo violent chemical change but do not detonate. This degree includes materials which can undergo chemical change with rapid release of energy at normal temperatures and pressures or which can undergo violent chemical change at elevated temperatures and pressures. It also includes those materials which may react violently with water or which may form potentially explosive mixtures with water.

(44) "Head" means a liquid-tight transverse closure at the end of a cargo tank.

(45) "Hot work" means work involving open flames, cutting and welding using open flames or electric arcs, grinding, buffing or open unguarded sources of ignition.

(46) "Hotels" means buildings or groups of buildings under the same management in which there are sleeping accommodations for hire, primarily used by transients who are lodged with or without meals including but not limited to inns, clubs, motels and apartment hotels.

(47) "Inert gas" means any gas which is nonflammable, chemically inactive and noncontaminating for the use intended and oxygen deficient to the extent required.

(48) "Inerting" means the use of an inert gas to render the atmosphere of an enclosure or within equipment substantially oxygen free or to reduce the oxygen content to a point at which combustion cannot take place.

(49) "Instructional laboratory unit" means a laboratory unit in an educational occupancy in which the person or persons conducting chemical experiments or tests are under the direct supervision of faculty members or their assistants. Laboratory units used for graduate or post-graduate research are not considered instructional laboratory units.

(50) "Integral tank" means furnished by the manufacturer as an integral part of an oil-burning appliance.

(51) "Key, card or code operated dispensing device" means a refueling device designed for purpose of restricting its use to authorize personnel only. The device must be provided with gallonage totalizer panel and made operable by use of a special key, card or code issued only to authorized personnel. The key, card or code are to be only obtainable from the manufacturer of the device. The device is not intended for sale of petroleum products unless it includes a monetary totalizer.

(52) "Labeled" means equipment or materials to which has been attached a label, symbol or other identifying mark of a nationally recognized testing laboratory, inspection agency, or other organization concerned with product evaluation that maintains periodic inspection of production of labeled equipment or materials, and by whose labeling is indicated compliance with nationally recognized standards or tests to determine suitable usage in a specified manner.

(53) "Laboratory" means a room or space for testing, analysis, research, instruction or similar activities which involves the use of chemical materials.

(54) "Laboratory apparatus" means furniture, laboratory hoods, centrifuges, refrigerators and commercial or made-on-site apparatus used in a laboratory.

(55) "Laboratory building" means a structure consisting wholly or principally of laboratory units.

(56) "Laboratory unit" means an enclosed space used for experiments or tests. Laboratory units may include offices, laboratories and other contiguous rooms maintained for or used by laboratory personnel, and corridors within the units. A laboratory unit may contain any number of separate laboratories.

(a) "Class A laboratory unit" means a laboratory unit in which the quantities of flammable, or flammable and combustible liquids exceed those for a Class B laboratory unit as shown in Table 2-1 of NFPA No. 45 but do not exceed those shown for a Class A laboratory unit.

(b) "Class B laboratory unit" means a laboratory unit in which the quantities of flammable, or flammable and combustible liquids exceed those for a Class C laboratory unit as shown in Table 2-1 of NFPA No. 45 but do not exceed those shown for a Class B laboratory unit.

(c) "Class C laboratory unit" means a laboratory unit in which the quantities of flammable, or flammable and combustible liquids do not exceed those shown for a Class C laboratory unit as shown in Table 2-1 of NFPA No. 45.

(57) "Laboratory unit separation" means all walls, partitions, floors and ceilings, including openings in them, between a laboratory unit and adjoining areas in the building.

(58) "Liquid" means any material which has a fluidity greater than that of 300 penetration asphalt. When not otherwise identified, the term liquid includes both flammable and combustible liquids.

(59) "Liquid warehouse" means a separate, detached building or attached building used for warehousing type operations for liquids.

(60) "Listed" means equipment or materials included in a list published by a nationally recognized testing laboratory, inspection agency or other organization 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 nationally recognized standards or has been tested and found suitable for use in a specified manner. The means for identifying listed equipment may vary for each testing laboratory, inspection agency or other organization concerned with product evaluation, some of which do not recognize equipment as listed unless it is also labeled.

(61) "Low pressure tank" means a storage tank designed to withstand an internal pressure above 0.5 psig but not more than 15 psig.

(62) "Manual oil shut-off valve" means a manually operated valve in an oil line for the purpose of turning on or completely shutting off the oil supply to the burner.

(63) "Marine service station" means that portion of a property where liquids used as fuels are stored and dispensed from fixed equipment on shore, piers, wharves or floating docks into the fuel tanks of self-propelled craft, and includes all facilities used in connection with them.

(64) "Mercantile occupancy" means the occupancy or use of a building or structure or any portion thereof for the displaying, selling or buying of goods, wares or merchandise.

(65) "Monomers" means unsaturated organic compounds, containing a reactive group, which polymerize by themselves or with other monomers to produce polymers. These monomers may be liquids (styrene, ethyl acrylate), gases (butadiene, vinyl chloride), or solids (acrylamide), and exhibit the same flammability characteristics that would be expected of any organic compound with their physical constants.

(66) "Nitrocellulose" means nitrated cellulose (cotton linters or wood pulp) with a nitrogen content ranging from 10.5 percent to 12.6 percent. It is a fibrous, granular, cubed or flake-like material wetted with not less than 25 percent alcohol or other organic liquid having a flash point not lower than 30 degrees F. Nitrocellulose may also be wetted with not less than 25 percent water.

(67) "Nonlaboratory area" means any space within a building not included in a laboratory unit.

(68) "Office occupancy" means the occupancy or use of a building or structure or any portion thereof for the transaction of business, or the rendering or receiving of professional services.

(69) "Oil burning equipment" means an oil burner of any type together with its tank, piping, wiring, controls and related devices and includes all oil burners, oil-fired units, and heating and cooking appliances.

(70) "Oil control valve" means an automatically or manually operated device consisting essentially of an oil valve for controlling the fuel supply to a burner.

(a) "Metering or regulating valve" means an oil control valve for regulating burner input.

(b) "Safety valve" means an automatic oil control valve of the "on" and "off" type without any by-pass to the burner and that is actuated by a safety control or by an emergency device.

(71) "Organic coatings" means liquid mixtures of binders such as alkyd, nitrocellulose, acrylic or oil, and flammable and combustible solvents such as hydrocarbon, ester, ketone or alcohol, which when spread in a thin film convert to a durable protective and decorative finish. These mixtures may contain pigments.

(72) "Organic peroxides" means those organic compounds which are identified by their active oxygen (-O-O-) being combined with the organic radical. This group of reactive chemicals are derivatives of hydrogen peroxides in which one or both hydrogen atoms are replaced by a hydrocarbon or heterocyclic or acid radical. Some peroxides are heat and shock sensitive and are known as "potentially explosive chemicals." Examples of such peroxides are benzoyl peroxide and methyl ethyl ketone peroxide.

(73) "Pilot plant" means an experimental assembly of manufacturing equipment for exploring process variables or for producing semi-commercial quantities of materials.

(74) "Place of employment" means any location within the jurisdiction of the department pursuant to s. 101.02, Stats., at which flammable and combustible liquid tanks, their products and attached pumping systems are considered to be integral and indispensable parts of the place of employment or public building.

(75) "Portable shipping tank" means any tank having a liquid capacity in excess of 60 U.S. gallons and not exceeding 660 U.S. gallons which is readily movable from place to place either with or without special handling equipment and which is not permanently attached to its transporting vehicle.

(76) "Portable tank" means any closed vessel having a liquid capacity over 60 U.S. gallons and not intended for fixed installation.

(77) "Potentially explosive reaction" means any chemical procedure that uses or forms reactive materials.

(78) "Pressure vessel" means any fired or unfired vessel within the scope of chs. Ind 41-42, Wis. Adm. Code.

(79) "Protection for exposures" means fire protection for structures on property adjacent to liquid storage. Fire protection for such structures is acceptable when located within the jurisdiction of any public fire department, or adjacent to plants having private fire brigades capable of providing cooling water streams on structures on property adjacent to liquid storage.

(80) "Public way" means public thoroughfare, dedicated alley, railroad right-of-way or waterway.

(81) "Pump, automatic oil" means a pump which is not an integral part of an oil burner and which automatically pumps oil from the supply tank and delivers the oil by gravity under a constant head to an oil-burning appliance. The pump is designed to stop pumping automatically in case of total breakage of the oil supply line between the pump and the appliance.

(82) "Pump, oil transfer" means an automatically or manually operated pump which transfers oil through continuous piping from a supply tank to an oil-burning appliance or to an auxiliary tank, and which is not designed to stop pumping automatically in case of total breakage of the oil supply line between the pump and the appliance.

(83) "Reactive material" means a material that by itself is readily capable of detonation or of explosive decomposition or explosive reaction at normal or elevated temperatures and pressures.

(84) "Refinery" means a plant in which flammable or combustible liquids are produced on a commercial scale from crude petroleum, natural gas or other hydrocarbon sources.

(85) "Roll coating" means the process of applying or impregnating materials, or both, by bringing them into contact with a roller that is coated with a liquid.

(86) "Safety can" means an approved container, of not more than five gallons capacity, having a spring-closing lid and spout cover and so designed that it will safely relieve internal pressure when subjected to fire exposure.

(87) "Self-service station" means that portion of property where flammable or combustible liquids used as motor fuels are stored and where the fuel is dispensed by the general public into the fuel tanks of motor vehicles or into approved containers by use of automatic dispensing units.

(88) "Separate inside storage area" means a room or building used for the storage of liquids in containers or portable tanks, separated from other types of occupancies.

(a) "Inside room" means a room totally enclosed within a building and having no exterior walls.

(b) "Cut-Off room" means a room within a building and having at least one exterior wall.

(c) "Attached building" means a building having only one common wall with a building having other type occupancies.

(89) "Stable liquids" means those liquids having a relative capacity to resist changes in their chemical composition which would produce violent reactions or detonations despite exposure to air, water, heat, including the normal range of conditions encountered in handling, storage and transportation.

(90) "Storage cabinet" means a cabinet for the storage of flammable and combustible liquids.

(91) "Storage room" means a room for the storage of flammable and combustible liquids that is cut off from surrounding areas and constructed and ventilated in accordance with the requirements for inside storage rooms for flammable and combustible liquids of this chapter.

(92) "Storage tank" means a separate tank which is not connected to the oil-burning appliance.

(93) "Story" means that portion of a building included between the upper surface of a floor and the upper surface of the floor or roof next above.

(94) "Street floor" means any story or floor level accessible from the street or from outside the building at ground level with floor level at main entrance not more than three risers above or below ground level at these points, and so arranged and utilized to qualify as the main floor. When, due to differences in street levels, there are two or more stories accessible from the street, each is a street floor.

(95) "Sump" means the receptacle employed with a vacuum tank.

(96) "Supply tank" means a separate tank connected directly or by a pump to the oil-burning appliance.

(97) "Tank full trailer" means any vehicle with or without auxiliary motive power, equipped with a cargo tank mounted on or built as an integral part of, and used for the transportation of flammable and combustible liquids or asphalt so constructed that practically all of its weight and load rests on its own wheels.

(98) "Tank semitrailer" means any vehicle with or without auxiliary motive power, equipped with a cargo tank mounted on or built as an integral part of, and used for the transportation of flammable and combustible liquids or asphalt so constructed that when drawn by a tractor by means of a fifth wheel connection, some part of its load and weight rests upon the towing vehicle.

(99) "Tank truck" means any single self-propelled motor vehicle equipped with a cargo tank mounted thereon and used for the transportation of flammable and combustible liquids or asphalt.

(100) "Tank vehicle" means any tank truck, tank full trailer, or tractor and tank semitrailer combination.

(101) "Unattended laboratory operation" means that no person is present who is knowledgeable regarding the operation and emergency shut-down procedures.

(102) "Unstable or reactive liquid" means a liquid which in the pure state or as commercially produced or transported will vigorously polymerize, decompose, condense, or will become self-reactive under conditions of shock, pressure or temperature.

(103) "Vacuum or barometric tank" means a tank not exceeding 5 gallons capacity, which maintains definite level of oil in a sump or similar receptacle by barometric feed. Fuel is delivered from the sump to the burner by gravity.

(104) "Vapor area" means any area containing flammable vapor concentrations exceeding 25 percent of the lower flammable limit (LFL) in the vicinity of dipping and coating processes, drain boards or associated drying, conveying or other equipment, during operation or shut-down periods. The authority having jurisdiction may determine the extent of the vapor area, taking into consideration the characteristics of the liquid, the degree of sustained ventilation, and the nature of the operations.

Note #1: A vapor area is created by the exposed surface of a liquid when the temperature of the liquid is equal to or above its flash point. Hence, a liquid with a flash point of 100 degrees F. may create a vapor area without the application of heat when used in a very warm atmosphere. When heat is applied to a liquid automatic arrangements to properly limit the liquid temperature will assist in preventing the formation of a vapor area.

Note #2: When unenclosed dipping operations involve highly volatile liquids or large exposed surfaces, either in an open tank or on dipped materials, the vapor area may extend to all portions of the room in which the process is located. When, however, operations are provided with adequate continuous ventilation, the vapor area may extend only a limited distance.

(105) "Vapor pressure" means the pressure, measured in pounds per square inch absolute, exerted by a liquid.

(106) "Vapor processing equipment" means those components of a vapor processing system which are designed to process vapors or liquids captured during filling operations at service stations, bulk plants or terminals.

(107) "Vapor processing system" means a system designed to capture and process vapors displaced during filling operations at service stations, bulk plants or terminals by use of mechanical or chemical means or both.

Note: Examples are systems using blower-assist for capturing vapors, and refrigeration, absorption and combustion systems for processing vapors.

(108) "Vapor recovery system" means a system designed to capture and retain, without processing, vapors displaced during filling operations at service stations, bulk plants or terminals.

Note: An example is a balanced-pressure vapor displacement system.

(109) "Ventilation" means movement of air for the prevention of fire and explosion. Ventilation is considered adequate if it is sufficient to prevent accumulation of significant quantities of vapor-air mixtures in concentration over one-fourth of the lower flammable limit.

Ind 8.004 ADOPTION OF NATIONAL FIRE PROTECTION ASSOCIATION STANDARDS. The following National Fire Protection Association (NFPA) standards, subject to the omissions, changes and additions specified in ss. Ind 8.007-8.105, are hereby incorporated by reference into ch. Ind 8. Interim amendments of these standards will have no effect in the state until such time as this section is correspondingly revised to reflect the changes.

- (1) Standard for the installation of sprinkler systems, NFPA No. 13-1980.
- (2) Standard for dipping and coating processes using flammable and combustible liquids, NFPA No. 34-1979.
- (3) Standard for the manufacturer of organic coatings, NFPA No. 35-1976.
- (4) Standard for tank vehicles for flammable and combustible liquids, NFPA No. 385-1979.
- (5) Standard on fire protection for laboratories using chemicals, NFPA No. 45-1975.

Ind 8.005 CONSENT TO INCORPORATE NFPA STANDARDS BY REFERENCE. Pursuant to s. 227.025, Stats., the Attorney General and the Revisor of Statutes have consented to the incorporation by reference of the standards, except for the omissions, changes and additions specified, NFPA No. 13-1980, NFPA No. 34-1979, NFPA No. 35-1976, NFPA No. 385-1979, and NFPA No. 45-1975, which can be obtained from the National Fire Protection Association, Batterymarch Park, Quincy, Massachusetts 02269. Copies of these standards are on file in the offices of the department, the Secretary of State and the Revisor of Statutes.

Ind 8.006 *SECONDARY REFERENCES. For the purposes of this code, the department will enforce the applicable provisions of the following Wisconsin Administrative Codes, where the indicated national standards are referenced in the adopted NFPA standards.

(1) BOILER AND PRESSURE VESSELS. Chapters Ind 41-42 Boiler and Pressure Vessel Code in lieu of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code.

(2) BUILDING CODE. Chapters Ind 50-64 - Building and Heating, Ventilating and Air Conditioning Code in lieu of the following National Fire Protection Association (NFPA) standards.

(a) NFPA No. 14 - Standard for the Installation of Standpipe and Hose Systems.

(b) NFPA No. 24 - Standard for Outside Protection.

(c) NFPA No. 80 - Standard for Fire Doors and Windows.

(d) NFPA No. 101 - Life Safety Code.

(e) NFPA No. 220 - Standard Types of Building Construction.

(f) NFPA No. 251 - Standard Methods of Fire Tests of Building Construction and Materials.

(3) ELECTRICAL CODE. Chapter ILHR 16 State Electrical Code in lieu of National Fire Protection Association (NFPA) Standard No. 70 - National Electrical Code.

Ind 8.007 AMENDMENTS TO NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) STANDARD NO. 13-1980. (1) DELETIONS. The following sections of NFPA No. 13-1980 are not incorporated by reference as part of this chapter:

*See appendix for further explanatory material.

- (a) Appendix A;
- (b) Appendix B;
- (c) Appendix C;
- (d) Appendix D; and
- (e) Appendix E.

Ind 8.008 AMENDMENTS TO NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) STANDARDS No. 34-1979. (1) DELETIONS. The following sections of NFPA No. 34-1979 are not incorporated by reference as part of this chapter:

- (a) Chapter 1, Scope and Definitions;
- (b) Appendix A;
- (c) Appendix B; and
- (d) Appendix C.

Ind 8.009 AMENDMENTS TO NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) STANDARD NO. 35-1976. (1) DELETIONS. The following sections of NFPA No. 35-1976 are not incorporated by reference as part of this chapter:

- (a) Chapter 1, Introduction;
- (b) Section 7-4 Outside Fire Protection;
- (c) Section 7-7 Stand Pipe and Hose System;
- (d) Appendix A; and
- (e) Appendix B

(2) CHANGES. The following changes to NFPA No. 35 - 1976 are included as part of this chapter:

(a) Section 3-5.3(d) The bursting strength of the vent closure, or the minimum pressure required to open the vent closure if movable as a whole. Explosion venting shall be designed and constructed in accordance with standards approved by the department.

(b) Section 4-1.6 The dispensing of small quantities of Class I liquids from drums shall be by means of an approved drum pump.

(c) Section 5-2.3 Storage tanks inside of buildings shall be permitted only in areas at or above grade which have adequate drainage and are separated from the processing area by construction having a fire resistance rating of at least 2 hours. Openings to other rooms or buildings shall be provided with non-combustible liquid-tight raised sills or ramps at least 4 inches in height, or the floor in the storage area shall be at least 4 inches below the surrounding floor. A permissible alternate can be an open-grated trench inside of the room which drains to an underground tank. Openings shall be protected with approved self-closing fire doors. The room shall be liquid-tight where the walls join the floor.

(d) Section 6-1.5.1 Sweepings and other waste nitrocellulose shall be placed in a covered metal container and wet down with water immediately. Disposal of the waste material shall be by burning in a safe, isolated location. Disposal shall not be by burning in a boiler fire box, incinerator or other confined equipment. Burning shall only be conducted in accordance with Department of Natural Resources administrative rules regarding pollution.

(e) Section 6-2.5.1 All quantities of waste monomers or material contaminated with monomers shall be disposed of by removal to a safe, open area and burned. Department of Natural Resources administrative rules regarding health and pollution shall be observed.

Ind 8.10 AMENDMENTS TO NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) STANDARD No. 385-1979. (1) DELETIONS. The following sections of NFPA No. 385 - 1979 are not incorporated by reference as part of this chapter:

- (a) Chapter 1, General Provisions; and
- (b) Appendix.

(2) CHANGES. The following changes to NFPA No. 385 - 1979 are included as part of this chapter:

(a) Section 2-2 Cargo tanks, piping and connections designed for transporting flammable and combustible liquids above their boiling points shall be built in accordance with Specifications NC-307 or MC-331 of Part 178 of Title 49, Code of Federal Regulations, or in accordance with ch. Ind 9, Wis. Adm. Code.

(b) Section 2-3.1 General Requirements. Cargo tanks constructed after the effective date of this standard shall be constructed in accordance with the requirements contained in section 2-3.

Ind 8.105 AMENDMENTS TO NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) STANDARD 45-1975. (1) DELETIONS. The following sections of NFPA No. 45-1975 are not incorporated by reference as part of this chapter:

- (a) Chapter 1, General;
- (b) Appendix A;
- (c) Appendix B;
- (d) Appendix C; and
- (e) Appendix D.

(2) CHANGES. The following change to NFPA No. 45 - 1975 is included as part of this chapter:

(a) Section 6-3.1.1 Air exhausted from laboratory hoods shall not be recirculated except air may be recirculated to the hood face area if the design of the hood structure incorporates this feature.

SUBCHAPTER 2
ADMINISTRATION AND ENFORCEMENT

Ind 8.11 APPROVAL OF PROPOSED CONSTRUCTION, INSTALLATION OR OPERATION.

(1) GENERAL. (a) Except as provided in par. (b), written approval, plan review and approval or both from the Department or its authorized deputy shall be obtained before commencing any construction of new or additional installation or change in operation of a previously approved installation for the storage, handling or use of flammable or combustible liquids.

(b) Exception. Approval need not be obtained for:

1. Oil burning installations for one- and 2-family dwellings.
2. Flammable and combustible liquid tanks located on farms.

(2) LOCAL APPROVAL. Plans shall be submitted to and approved in writing by the chief of the local fire department or other local official specified by ordinance for installations in which all tanks for storage, handling or use of flammable or combustible liquid have an individual capacity of less than 5,000 gallons.

(3) DEPARTMENTAL APPROVAL. (a) Installations, as specified in subsection (2), but located in areas where the authority to approve has not been granted by ordinance to the fire chief or local official, shall be approved in writing by the department.

(b) At least 3 sets of plans, which are clear, legible and permanent copies, and one copy of specifications and complete information shall be submitted to the department for examination and approval before commencing construction on installations in which one or more tanks for storage, handling or use of flammable or combustible liquid will have individual capacity of 5,000 gallons or larger.

(c) Plans for general service stations and self-service stations, conversion of general service stations to self-service stations or change of operation to the use of key, card or code operated dispensing devices shall be submitted for review and approval by the department or its authorized deputy as required by chs. Ind 50-64, Wis. Adm. Code.

(d) Exceptions. Approval of plans shall not be required for the following:

1. Replacement with approved equipment, other than storage tanks, at approved existing facilities other than general or self-service stations.

2. Class II and Class III flammable or combustible liquid tanks of a capacity not exceeding 275 gallons used for the heating of buildings.

3. Individual containers not exceeding 60 gallons in capacity.

4. Fuel supply tanks of a motor vehicle, aircraft, watercraft, mobile power plants or mobile heating plants.

(4) PLANS, SPECIFICATIONS AND INFORMATION. Plans, specifications and information submitted to the department for review and approval shall contain the following:

(a) The name of the owner; the name of the person, firm or corporation proposing the construction or installation, if other than the owner; the address of the facility including the names of adjacent streets and highways.

(b) A plot plan indicating the location of the facility or installation with respect to property lines, lot lines, adjoining streets or alleys and other buildings on the same lot or property. The layout of buildings, tanks, loading and unloading docks, type of construction of each building and any stream or body of water within 150 feet of the tanks shall also be indicated.

(c) The location, size and capacity of each tank and the class of liquid to be stored.

(d) The type of tank supports, clearances, type of venting and pressure relief used and combined capacity of all venting and relief valves on each tank for aboveground storage.

(e) The clearances, location of fill, gauge and vent pipes and other openings for underground storage.

(f) Additional data and information for storage, handling or use of flammable or combustible liquids within buildings or enclosure to demonstrate compliance with the requirements of this code.

(g) Location of burners, tanks, pumps, piping and control valves and the elevations of buildings and the lowest floor or pit in relation to the installation for oil burning equipment in incidental storage.

(h) Plans for service stations involving the use of automatic dispensing units shall indicate the location of emergency controls and shall include the following, if applicable:

1. The location and details of the key, card or code operated dispensing devices;

2. A copy of the agreement between the key, card or code holder and the station owner; and

3. A copy of the program used to train those persons who will operate the key, card or code dispensing devices.

(i) Location and details of collection sump (see s. Ind 8.21).

(5) ADDITIONAL APPROVAL. (a) Local Ordinances. Approval of plans as to compliance with the requirements of this chapter covers only the uniform statewide fire safety and technical controls of storage, handling and use of flammable or combustible liquids and is subject to compliance with additional requirements in applicable building codes, local zoning and similar ordinances.

(6) *APPLICATION FOR APPROVAL. An Application for Installation of Bulk Storage Flammable Liquid/Liquid Petroleum/Natural Gas Tanks form shall be included with each application for approval.

Note #1: See Appendix for an example of the Application for Installation of Bulk Storage Flammable Liquid/Liquid Petroleum/Natural Gas Tanks form (SBD-9).

Note #2: Form SBD-9 is available from the Department of Industry, Labor and Human Relations, Division of Safety and Buildings, P.O. Box 7969, Madison, Wisconsin 53707.

(a) If, upon examination, the department or local official having approval jurisdiction determines that the plans and the application for approval substantially conform to the provisions of this chapter, a conditional approval, in writing, will be granted. All noncode complying conditions stated in the conditional approval shall be corrected before or during construction or erection. A conditional approval issued by the department or local official having approving jurisdiction shall not be construed as an assumption of any responsibility for the design or construction of a flammable and combustible liquid facility.

*See Appendix for further explanatory material.

(b) If the department or local official having approval jurisdiction determines that the plans or application do not substantially conform to the provisions of this chapter, the application for conditional approval will be denied, in writing.

(c) In the event of a dispute as to whether the information submitted to a local official having approval jurisdiction shows compliance with the provisions of this chapter, the application shall be submitted to the department for review and the decision of the department shall govern.

Ind 8.115 REVOCATION OF APPROVAL. The department may revoke any approval issued under the provisions of this chapter for any false statements or misrepresentation of facts upon which the approval was based.

Ind 8.12 DEPARTMENTAL LIMITATION AND EXPIRATION OF PLAN APPROVAL. Plan approval by the department or its authorized deputy shall expire one year after the date indicated on the approved plans, if construction has not commenced within that year.

Ind 8.125 ENFORCEMENT AND INSPECTIONS. (1) ENFORCEMENT. The administrative rules in this chapter shall be enforced by the department and its deputies, and by all local officials or bodies having jurisdiction to approve plans or specifications or issue permits for construction, alterations or installations within the scope of this chapter or having authority to investigate and eliminate related fire hazards.

(2) *INSPECTIONS. Inspections shall be conducted by an authorized representative of the department or by local officials having jurisdiction to ascertain whether or not the construction or installations conform to the conditionally approved plans, the conditional approval letter, and the provisions of this chapter.

Note #1: See Appendix for example of Inspection Checklist for Underground Tank Installation form SBD-6294. The original copy is to be given to the owner and a copy is to be retained by the fire department as part of their permanent file.

Note #2: Form SBD-6294 will be provided to fire departments at no cost upon request.

(3) INSPECTION BEFORE COVERING INSTALLATIONS. (a) The installer shall notify the chief of the local fire department, in writing, before covering an installation for which approval is required.

(b) The chief of the fire department or authorized representative shall inspect the installation and give written notice of approval or disapproval.

Ind 8.13 FEES. Fees shall be submitted to the department pursuant to ch. Ind 69, Wis. Adm. Code. Fees shall be submitted at the time the application for approval is submitted. No plan examinations, approvals or inspections will be made until the fees are received.

*See Appendix for further explanatory material.

Ind 8.135 *PETITION FOR MODIFICATION. The department will consider and may grant modification to an administrative rule upon receipt of a fee, a completed petition for modification form from the owner, and a position statement from the fire department having responsibility and an interest in the rule provided an equivalency is established in the petition for modification which meets the intent of the rule being petitioned. The department may impose specific conditions in the petition for modification to promote the protection of the health, safety and welfare of the employes or the public. Violation of those conditions under which the petition for modification is granted constitutes a violation of these rules.

Note #1: See Appendix for an example of the Petition for Modification Form (form SB-8) and the Fire Department Position Statement Form (form SB-8A).

Note #2: Section 101.02 (6), Stats., outlines the procedure for submitting petitions to the department and the department's procedures for hearing petitions.

Ind 8.14 PENALTIES. Penalties for violations shall be assessed in accordance with s. 101.02, Stats.

Note #1: Section 101.02 (13) (a), Stats., indicates penalties will be assessed against any employer, employe, owner or other person who fails or refuses to perform any duty lawfully enjoined, within the time prescribed by the department for which no penalty has been specifically provided, or who fails, neglects or refuses to comply with any lawful order made by the department or any judgement or decree made by anyone in connection with ss. 101.01 to 101.25, Stats. For each such violation, failure or refusal, such employe, owner or other person must forfeit and pay into the state treasury a sum not less than \$10.00 nor more than \$100.00 for each violation.

Note #2: Section 101.02 (12), Stats., indicates that every day during which any person, persons, corporation or any officer, agent or employe thereof, fails to observe and comply with an order of the department will constitute a separate and distinct violation of such order.

SUBCHAPTER 3 GENERAL PROVISIONS

Ind 8.15 GENERAL PROVISIONS FOR SALE, PURCHASE, DISPENSING OR USE OF FLAMMABLE LIQUIDS. (1) LABELING. No sale or purchase of any Class I, II or III liquids shall be made in containers, unless such containers are clearly marked with the name of the product.

(2) CONTAINERS. (a) A Class I flammable liquid when used in starting an engine or as fuel for a small heating appliance, lighting appliance, power tool or gasoline engine shall be dispensed only from an approved, properly identified safety can or screwed cover spout can approved for that specific use.

*See Appendix for further explanatory material.

(b) No dispensing of any liquids having a flash point of less than 100 degrees F. shall be made into portable containers or portable tanks unless that such container or tank is substantially a bright red color, is listed or classified by Underwriter's Laboratory (U.L.), or is constructed of metal having a tight closure with screwed or spring cover, and is fitted with a spout or so designed that the contents can be poured without spilling.

(c) No kerosene, fuel oil or similar liquids having a flash point of 100 degrees F. or more shall be filled into any portable container or portable tank colored red.

Note: See s. 168.11, Stats. for additional requirements.

(3) DISPENSING WHILE ENGINE IS RUNNING. A Class I flammable liquid shall not be dispensed into the fuel supply tank of any type internal combustion engine while the engine is running, except as permitted in ss. Ind 8.16 and Ind 8.48 (1).

(4) REPAIR AND MAINTENANCE, SOURCES OF IGNITION. Repair and maintenance work involving a possible source of ignition shall not be performed in a room or area containing or likely to contain an ignitable mixture of hydrocarbon vapors and air.

(5) DEGREASING AND CLEANING. A Class I flammable liquid shall not be used for degreasing or cleaning any engine, machine, equipment or part thereof, or for cleaning a floor, pit, or any part of a building or premises.

(a) Exception. Industrial processes requiring use of Class I flammable liquids for degreasing or cleaning any engine, machine or part thereof shall be designed to incorporate a ventilation system to reduce vapor concentration below fire and explosive limits.

(6) SATURATED CLOTHING. Clothing saturated with a Class I or II liquid shall not be worn longer than the time required for removal and shall not be worn or taken into a building where a source of ignition exists.

(7) DISPENSING FROM TANK VEHICLE TO SUPPLY TANK. Class I flammable liquids shall not be dispensed from a tank vehicle into the fuel supply tank of any type of internal combustion engine, except as permitted in s. Ind 8.48 (1) (b).

(8) [5-2.4.2] DRAWING OR TRANSFERRING OF CLASS I OR II LIQUIDS. Class I and Class II liquids shall be drawn from or transferred into vessels, containers or portable tanks within a building only from original shipping containers with a capacity of 5 gallons or less, from safety cans, through a closed piping system, or from a portable tank or container by means of a device drawing through an opening in the top of the tank or container.

Ind 8.155 DISPOSAL OF FLAMMABLE AND COMBUSTIBLE LIQUIDS. Flammable or combustible liquids shall not be dumped into sewers, but shall be stored in tanks or drums outside of any building until removed from the premises to an approved dumpsite or recycle factory for flammable and combustible liquids.

Ind 8.16 RACE TRACK FUELING STATIONS. Tanks of racing vehicles shall be filled from safety cans, or pumps, or approved systems or approved containers. During a race in which a vehicle is competing, it may be refueled while its engine is running. Signs prohibiting smoking in fueling areas shall be posted and an approved fire extinguisher of at least 20 BC classification shall be provided at each fueling location.

Ind 8.165 MOTOR VEHICLE EXHIBITION. Vehicles with internal combustion engines may be exhibited in buildings, other than in those where such vehicles are normally serviced or sold or both, provided the following requirements are satisfied:

(1) AREA SPECIFIED. A specific area shall be designated for display of such vehicles.

(2) EXITS. The vehicles shall not be displayed in any required passageway, corridor or exit way leading to an exit.

(3) RUNNING OF ENGINES. The vehicle engine shall not be started or run, except that vehicle may be driven in and out of the building under its own power but only when the building is not occupied by the general public.

(4) FUEL IN TANKS. The fuel supply in tanks shall be limited to not more than one gallon of fuel per vehicle when entering the building.

(5) DRAINING OF FUEL. When it is necessary to drain the excess fuel from the tank, the draining operation shall take place outside of the building.

(6) FUEL TANK CAP SECUREMENT. The fill cap shall be of a lock type or the cap shall be securely taped with a material that is not soluble in a petroleum fuel.

(7) FUEL LINE. The fuel line between fuel tank and fuel pump shall be disconnected and the engine operated until the carburetor is emptied of fuel.

(a) The fuel line shall then be reconnected.

(b) The air filter shall always remain in place.

(8) CARBURETOR. The throttle linkage to the carburetor shall be disconnected.

(9) BATTERY CABLES. The battery terminal cables shall be disconnected and wrapped with a nonconductor tape or capped with a rubber or plastic cap.

(10) FIRE EXTINGUISHER. One approved hand fire extinguisher of at least a 20 BC rating shall be located within 75 feet travel distance of any displayed vehicle.

(11) FIRE DEPARTMENT NOTIFICATION. The local fire department or the department shall be notified in writing 5 days in advance of the date the vehicle is to be displayed.

(12) INSPECTION. The local agency having jurisdiction or the department shall inspect the vehicles before the general public is permitted to occupy the building.

Ind 8.17 FUELING OF MOTOR VEHICLES. (1) GENERAL. (a) Except as specified in par. (b), motor vehicles shall be fueled only from underground storage tanks connected to an approved dispenser.

(b) Exceptions. 1. See ss. Ind 8.535 - 8.545 for marine service stations.

2. See ss. Ind 8.70 - 8.725 for farm and construction projects.

3. Emergency fueling of a motor vehicle from a portable container not exceeding 5 gallon capacity.

(2) APPLICATION. The provisions of this section shall apply to all fueling facilities in existence on the effective date of this rule and to facilities thereafter constructed.

Ind 8.175 CONTRACTOR TANKS AND FARM FUEL TANKS. Contractor tanks and farm fuel tanks shall conform to the requirements illustrated in figures 8.175-1 - 8.175-3 and with the following:

(1) TANK DESIGN. (a) Tanks shall be constructed of a minimum of 14 gauge steel with arc welded seams.

(b) Baffles shall be installed in tanks having a capacity in excess of 100 gallons.

(2) TANK COLOR AND LABELS. (a) Tanks or compartments storing gasoline shall be substantially a bright red color and labeled gasoline.

(b) Tanks or compartments storing diesel fuel or fuel oil shall be substantially yellow in color and labeled diesel fuel or fuel oil.

(3) STOPS AND ANCHORS. Stops and anchors shall be provided and attached to the vehicle to prevent movement of the tank.

(4) DISPENSING PUMPS. The tank shall be equipped with approved pumps for dispensing.

(5) FILL CAP AND VENT. Each compartment shall be equipped with a 2" prevent combination fill cap and vent (anti-spill type cap).

(6) MULTIPLE COMPARTMENT TANKS. If a compartment of a tank holding Class I liquids is adjacent to a compartment holding Class II or Class III liquids, an air space between the compartments shall be provided. A drain shall be provided in the space between the compartments and it shall be maintained in an operative condition.

(7) DEPARTMENT OF TRANSPORTATION (D.O.T.) DRUMS. The use of D.O.T. drums shall be prohibited.

(8) APPLICATION. The provisions of this section shall apply to all units in existence on the effective date of this rule and to others thereafter constructed.

2" PRE-VENT COMBINATION
FILL CAP AND VENT

ROTARY HAND PUMP

1" SUCTION PIPE

HOLD DOWN CLIPS

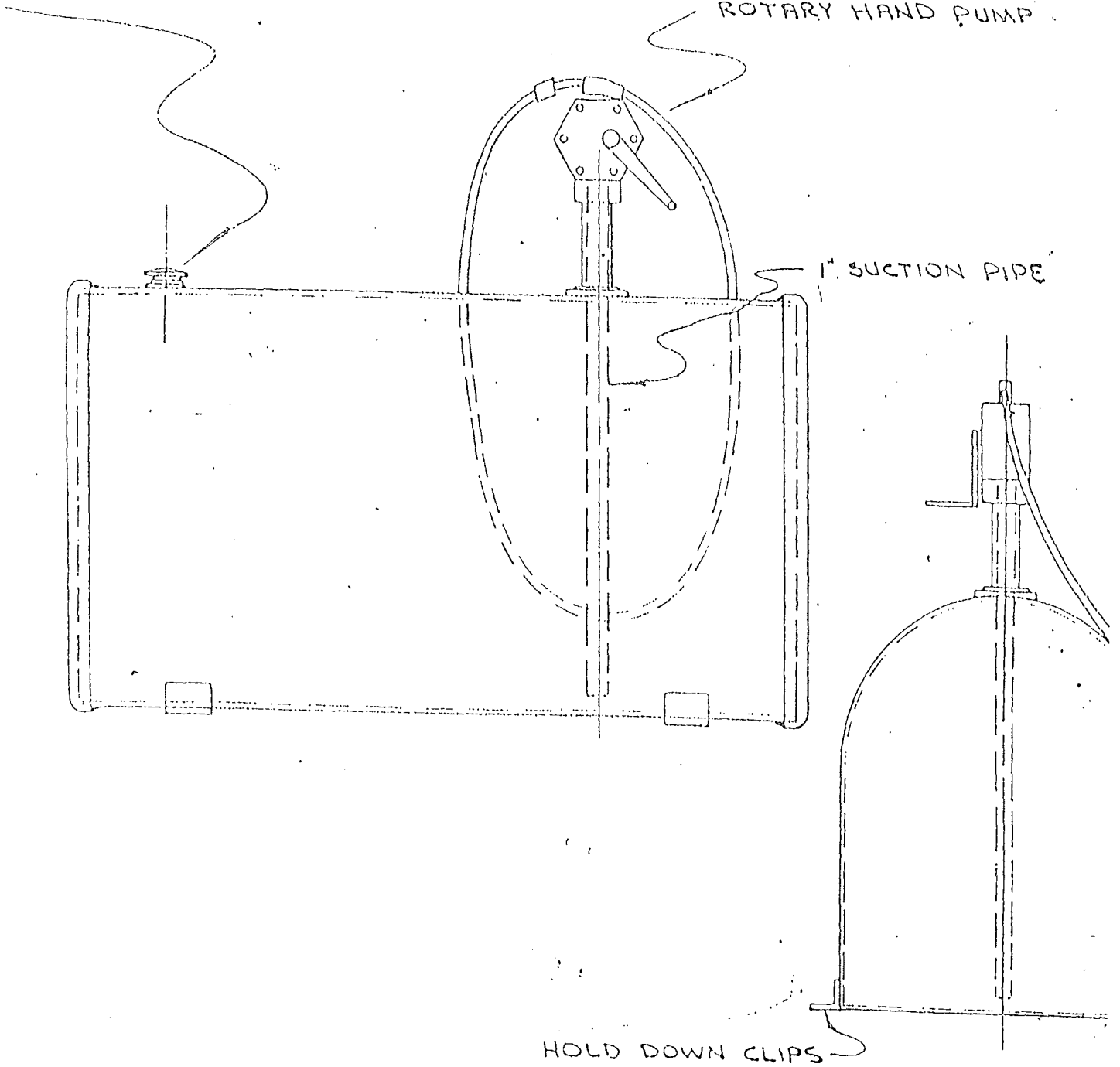


FIGURE 8.175-1
100 GAL. UTILITY TANK

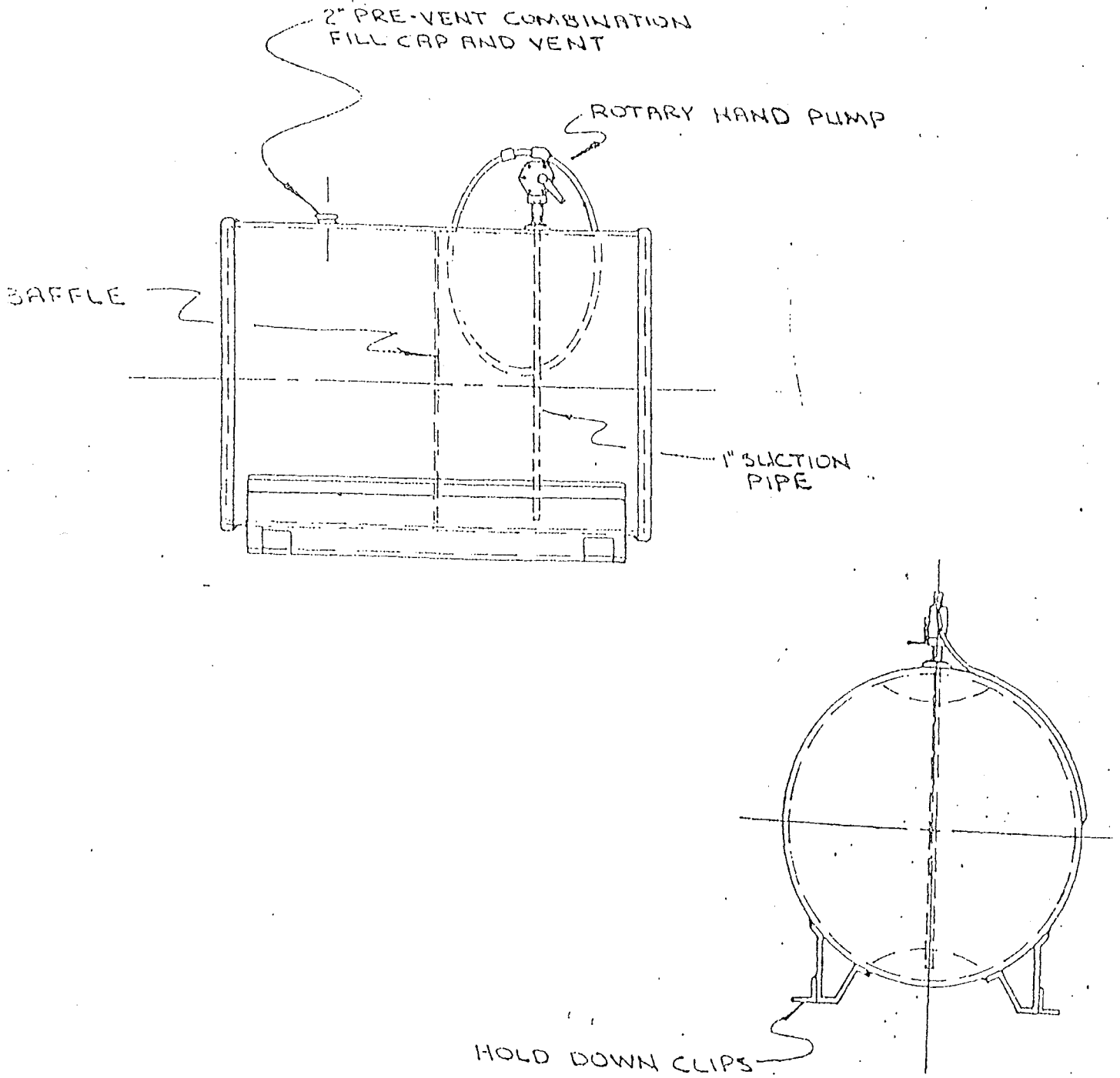


FIGURE 8.175-2
200 GAL. SKID TANK WITH BAFFLE

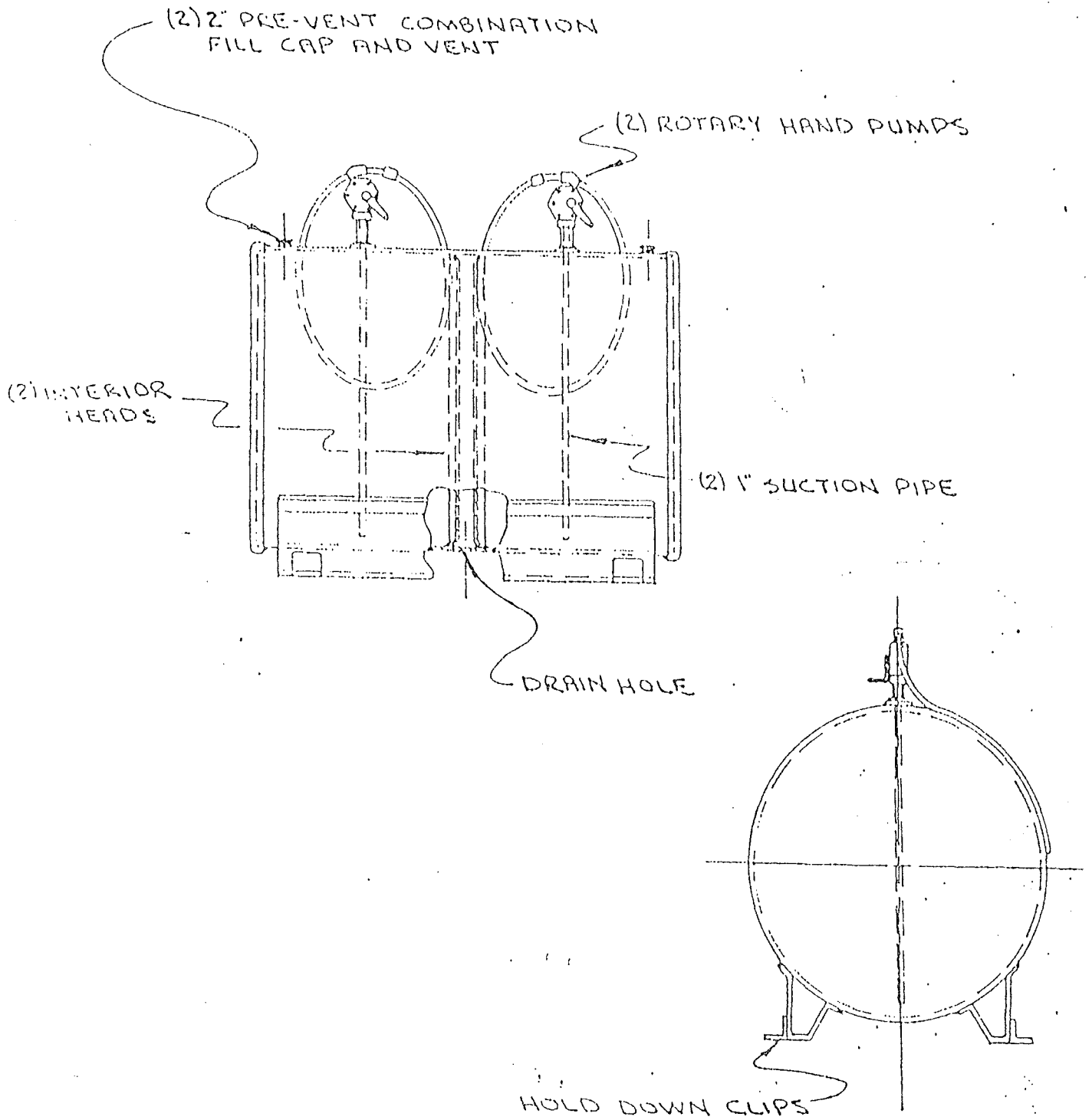


FIGURE 8.175-3
200 GAL. (2) COMPARTMENT SKID TANK

SUBCHAPTER 4
TANK STORAGE

Ind 8.18 [2-1] DESIGN AND CONSTRUCTION OF TANKS. (1) [2-1.1] MATERIALS. Tanks shall be designed and built in accordance with recognized good engineering standards for the material of construction being used, and shall be of steel with the following limitations and exceptions:

(a) The material of tank construction shall be compatible with the liquid to be stored. In case of doubt about the properties of the liquid to be stored, the supplier or producer of the liquid, or other competent authority shall be consulted.

(b) Tanks constructed of combustible materials shall be subject to the approval of the authority having jurisdiction and limited to:

1. Installation underground, or
2. Use where required by the properties of the liquid stored, or
3. Storage of Class IIIB liquids aboveground in areas not exposed to a spill or leak of Class I or Class II liquid, or
4. Storage of Class IIIB liquids inside a building protected by an approved automatic fire extinguishing system.

(c) Unlined concrete tanks may be used for storing liquids having a gravity of 40 degrees Air Position Indicator (API) or heavier. Concrete tanks with special linings may be used for other services provided the design is in accordance with sound engineering practice.

(d) Tanks may have combustible or noncombustible linings.

(e) Special engineering consideration shall be required if the specific gravity of the liquid to be stored exceeds that of water or if the tank is designed to contain liquids at a liquid temperature below 0 degrees F.

(2) [2-1.2] FABRICATION. (a) [2-1.2.1] Tanks may be of any shape or type consistent with sound engineering design.

(b) [2-1.2.2] Except as specified in par. (c), metal tanks shall be welded, riveted and caulked, or bolted, or constructed by use of a combination of these methods.

(c) The use of riveted or caulked tanks for underground use shall be prohibited.

(3) [2-1.3] ATMOSPHERIC TANKS. (a) [2-1.3.1] Atmospheric tanks shall be built in accordance with recognized standards of design approved by the department.

(b) [2-1.3.2] Low pressure tanks and pressure vessels may be used as atmospheric tanks.

(c) [2-1.3.3] Atmospheric tanks shall not be used for the storage of a liquid at a temperature at or above the boiling point of the liquid.

(4) [2-1.4] LOW PRESSURE TANKS. (a) [2-1.4.1] The normal operating pressure of the tank shall not exceed the design pressure of the tank.

(b) [2-1.4.2] Low pressure tanks shall be built in accordance with recognized standards of design approved by the department.

(c) [2-1.4.3] Tanks built according to Underwriters Laboratories, Inc., requirements in sub. (b) may be used for operating pressures not exceeding 1 psig and shall be limited to 2.5 psig under emergency venting conditions.

(d) [2-1.4.4] Pressure vessels may be used as low pressure tanks.

(5) PRESSURE VESSELS. (a) Pressure vessels shall be constructed of steel as shall comply with the applicable provisions of chs. Ind 41-42, Wis. Adm. Code.

(b) [2-1.5.1] The normal operating pressure of the vessel shall not exceed the design pressure of the vessel.

(c) [2-1.5.2] Storage tanks designed to withstand pressures above 15 psig shall comply with the requirements specified in par. (a).

(6) [2-1.6] PROVISIONS FOR INTERNAL CORROSION. When tanks are not designed in accordance with the American Petroleum Institute, American Society of Mechanical Engineers or the Underwriters Laboratories, Inc., Standards, or if corrosion is anticipated beyond that provided for in the design formulas used, additional metal thickness or suitable protective coatings or linings shall be provided to compensate for the corrosion loss expected during the design life of the tank.

Ind 8.185 TESTING NEW INSTALLATIONS. (1) GENERAL. All tanks, whether shop built or field erected, shall be strength tested before they are placed in service in accordance with the applicable paragraphs of the code under which they were built.

(2) CODE APPROVED VESSELS. The ASME code stamp, API monogram, or the label of the U.L., on a tank shall be evidence of compliance with this strength test.

(3) UNMARKED TANKS. Tanks not marked in accordance with the ASME, API or UL codes shall be strength tested before they are placed in service in accordance with good engineering principles and reference shall be made to the sections on testing in the codes specified in s. Ind 8.18 (3)(a), (4)(b) and (5)(a).

(4) HYDROSTATIC TESTS. (a) When the vertical length of the fill and vent pipes is such that when filled with liquid the static head imposed upon the bottom of the tank exceeds 10 pounds per square inch, the tank and related piping shall be tested hydrostatically to a pressure equal to the static head thus imposed.

(b) In special cases where the height of the vent above the top of the tank is excessive, the hydrostatic test pressure shall be specified by the department.

(5) TEST FOR TIGHTNESS. (a) All tanks and connections shall be tested for tightness by owner of tank.

(b) Except for underground tanks, this tightness test shall be made at operating pressure with air, inert gas or water prior to placing the tank in service.

(c) Underground tanks and piping, before being covered, enclosed, or placed in use, shall be tested for tightness hydrostatically, or with air pressure at not less than 3 pounds per square inch and not more than 5 pounds per square inch.

(d) In the case of field erected tanks, the strength test may be considered to be the test for tank tightness.

(6) REPAIR OF LEAKS OR DEFORMATIONS. All leaks or deformations shall be repaired before the tank is placed in service. Mechanical caulking is not permitted for correcting leaks in welded tanks, except pin hole leaks in the roof.

(7) TANKS OPERATED AT BELOW DESIGN PRESSURE. Tanks to be operated at pressures below their design pressure may be tested by the applicable provisions of subs. (1) to (4) based upon the pressure developed under full emergency venting of the tank.

Ind 8.19 [2-2] INSTALLATION OF OUTSIDE ABOVEGROUND TANKS. (1) INSTALLATION OF OUTSIDE ABOVEGROUND TANKS WITH RESPECT TO ELECTRICAL LINES. Location of outside aboveground tanks with respect to electrical lines shall conform with the provisions of ch. ILHR 16, Wis. Adm. Code.

(2) [2-2.1] LOCATION WITH RESPECT TO PROPERTY LINES, PUBLIC WAYS AND LOCATION WITH RESPECT TO PROPERTY LINES, PUBLIC WAYS AND IMPORTANT BUILDINGS ON THE SAME PROPERTY. (a) [2-2.1.1] Every aboveground tank for the storage of Class I, Class II or Class IIIA liquids, except as provided in paragraph (b), and of those liquids with boil-over characteristics and unstable liquids, operating at pressures not in excess of 2.5 psig and designed with a weak roof-to-shell seam or equipped with emergency venting devices which will not permit pressures to exceed 2.5 psig, shall be located in accordance with Table 8.19-1.

1. For the purpose of this section, a floating roof tank is defined as one which incorporates either:

a. A pontoon or double deck metal floating roof in an open top tank in accordance with nationally recognized standards, or

b. A fixed metal roof with ventilation at the top and roof eaves in accordance with nationally recognized standards and containing a metal floating roof or cover meeting any one of the following requirements: A pontoon or double deck metal floating roof meeting nationally recognized standards, or, a metal floating cover supported by liquid-tight metal pontoons or floats which provide sufficient buoyancy to prevent sinking of the cover when half of the pontoons or floats are punctured.

2. An internal metal floating pan, roof or cover which does not meet the requirements of subpar. 1., or one which uses plastic foam, except for seals, for flotation even if encapsulated in metal or fiberglass shall be considered as being a fixed roof tank.

(b) [2-2.1.2] Vertical tanks having a weak roof-to-shell seam and storing Class IIIA liquids may be located at one-half the distances specified in Table 8.19-1, provided the tanks are not within a diked area or drainage path for a tank storing a Class I or Class II liquid.

(c) [2-2.1.3] Every aboveground tank for the storage of Class I, Class II or Class IIIA liquids, except those liquids with boil-over characteristics and unstable liquids, operating at pressures exceeding 2.5 psig or equipped with emergency venting which will permit pressures to exceed 2.5 psig, shall be located in accordance with Table 8.19-2.

(d) [2-2.1.4] 1. Every aboveground tank for storage of liquids with boil-over characteristics shall be located in accordance with Table 8.19-3.

2. Liquids with boil-over characteristics shall not be stored in fixed roof tanks larger than 150 feet diameter, unless an approved inerting system is provided on the tank.

(e) [2-2.1.5] Every aboveground tank for the storage of unstable liquids shall be located in accordance with Table 8.19-4.

(f) [2-2.1.6] Every aboveground tank for the storage of Class IIIB liquids, excluding unstable liquids, shall be located in accordance with Table 8.19-5 except when located within a diked area or drainage path for a tank or tanks storing a Class I or Class II liquid. When a Class IIIB liquid storage tank is within the diked area or drainage path for a Class I or Class II liquid, par. (a) or (b) shall apply.

TABLE 8.19-1

Stable Liquids (Operating Pressure 2.5 psig or Less)

Type of Tank	Protection	Minimum Distance in Feet from Property Line Which is or Can be Built Upon, Including the Opposite Side of a Public Way and Shall be Not Less Than 5 Feet	Minimum Distance in Feet from Nearest Side of any Public Way or from Nearest Important Building on the Same Property and Shall be Not Less Than 5 Feet
Floating Roof	Protection for Exposures*	1/2 times diameter of tank	1/6 times diameter of tank
	None	Diameter of tank, but need not exceed 175 feet	1/6 times diameter of tank
Vertical with Weak Roof-to-Shell Seam	Approved foam or inerting system on tanks not exceeding 150 feet in diameter**	1/2 times diameter of tank	1/6 times diameter of tank
	Protection for Exposures*	Diameter of tank	1/3 times diameter of tank
	None	2 times diameter of tank, but need not exceed 350 feet	1/3 times diameter of tank
Horizontal and Vertical with Emergency Relief Venting to Limit Pressures to 2.5 psig	Approved inerting system on the tank or aproved foam system on vertical tanks	1/2 times Table 8.19-6	1/2 times Table 8.19-6
	Protection for Exposures*	Table 8.19-6	Table 8.19-6
	None	2 times Table 8.19-6	Table 8.19-6

* See definition for "Protection for Exposures."

**For tanks over 150 feet in diameter use "Protection for Exposures" or "None" as applicable.

TABLE 8.19-2
Stable Liquids (Operating Pressure Greater Than 2.5 psig)

Type of Tank	Protection	Minimum Distance in Feet from Property Line Which is or Can be Built Upon, Including the Opposite Side of a Public Way	Minimum Distance in Feet from Nearest Side of any Public Way or from Nearest Important Building on the Same Property
Any Type	Protection for Exposures*	1-1/2 times Table 8.19-6, but shall not be less than 25 feet	1-1/2 times Table 8.19-6, but shall not be less than 25 feet
	None	3 times Table 8.19-6, but shall not be less than 50 feet	1-1/2 times Table 8.19-6, but shall not be less than 25 feet

*See Definition for "Protection for Exposures."

TABLE 8.19-3
Boil-Over Liquids

Type of Tank	Protection	Minimum Distance in Feet from Property Line Which is or Can be Built Upon, Including the Opposite Side of a Public Way and Shall be not Less Than 5 Feet	Minimum Distance in Feet from Nearest Side of any Public Way or from Nearest Important Building on the Same Property and Shall be Not Less Than 5 Feet
Floating Roof	Protection for Exposures*	1/2 times diameter of tank	1/6 times diameter of tank
	None	Diameter of tank	1/6 times diameter of tank
Fixed Roof	Approved foam or inerting system	Diameter of tank	1/3 times diameter of tank
	Protection for Exposures*	2 times diameter of tank	2/3 times diameter of tank
	None	4 times diameter of tank but need not exceed 350 feet	2/3 times diameter of tank

*See definition for "Protection for Exposures."

TABLE 8.19-4

Unstable Liquids

Type of Tank	Protection	Minimum Distance in Feet from Property Line Which is or Can be Built Upon, Including the Opposite Side of a Public Way	Minimum Distance in Feet from Nearest Side of any Public Way or from Nearest Important Building on the Same Property
Horizontal and Vertical Tanks with Emergency Relief Venting to Permit Pressure not in excess of 2.5 psig	Tank Protected with any one of the following: Approved water spray, Approved inerting, Approved insulation and refrigeration, Approved barricade	Table 8.19-6 but, not less than 25 feet	Not less than 25 feet
	Protection for Exposures*	2-1/2 times Table 8.19-6, but not less than 50 feet	Not less than 50 feet
	None	5 times Table 8.19-6, but not less than 100 feet	Not less than 100 feet
Horizontal and Vertical Tanks with Emergency Relief Venting to Permit pressure Over 2.5 psig	Tank protected with any one of the following: Approved water spray, Approved inerting, Approved insulation and refrigeration, Approved barricade	2 times Table 8.19-6, but not less than 50 feet	Not less than 50 feet
	Protection for Exposures*	4 times Table 8.19-6, but not less than 100 feet	Not less than 100 feet
	None	8 times Table 8.19-6, but not less than 150 feet	Not less than 150 feet

*See definition for "Protection for Exposures."

TABLE 8.19-5

CLASS IIIB LIQUIDS

Capacity Gallons	Minimum Distance in Feet from Property Line Which is or Can be Built Upon, Including the Opposite Side of a Public Way	Minimum Distance in Feet from Nearest Side of any Public Way or from Nearest Important Building on the Same Property
12,000 or less	5	5
12,001 to 30,000	10	5
30,001 to 50,000	10	10
50,001 to 100,000	15	10
100,001 or more	15	15

TABLE 8.19-6

REFERENCE TABLE FOR USE IN TABLES 8.19-1 - 8.19-4

Capacity Tank Gallons	Minimum Distance in Feet from Property Line Which is or Can be Built Upon, Including the Opposite Side of a Public Way	Minimum Distance in Feet from Nearest Side of any Public Way or from Nearest Important Building on the Same Property
275 or less	5	5
276 to 750	10	5
751 to 12,000	15	5
12,001 to 30,000	20	5
30,001 to 50,000	30	10
50,001 to 100,000	50	15
100,001 to 500,000	80	25
500,001 to 1,000,000	100	35
1,000,001 to 2,000,000	135	45
2,000,001 to 3,000,000	165	55
3,000,001 or more	175	60

(g) [2-2.1.7] Where 2 tank properties of diverse ownership have a common boundary, the authority having jurisdiction may, with the written consent of the owners of the 2 properties, substitute the distances provided in par. (a) through (f) for the minimum distances set forth in subpar. (2).

(h) [2-2.1.8] Where end failure of horizontal pressure tanks and vessels can expose property, the tank shall be placed with the longitudinal axis parallel to the nearest important exposure.

(3) [2-2.2] SPACING (SHELL-TO-SHELL) BETWEEN ANY 2 ADJACENT ABOVEGROUND TANKS. (a) [2-2.2.1] Tanks storing Class I, II or IIIA stable liquids shall be separated in accordance with Table 8.19-7, except as provided in par. (b).

(b) [2-2.2.2] Crude petroleum tanks having individual capacities not exceeding 126,000 gallons (3,000 barrels), when located at production facilities in isolated locations, need not be separated by more than 3 feet.

(c) [2-2.2.3] Tanks used only for storing Class IIIB liquids may be spaced no less than 3 feet apart unless within a diked area or drainage path for a tank storing a Class I or II liquid, in which case the provisions of Table 8.19-7 apply.

(d) [2-2.2.4] For unstable liquids, the distance between such tanks shall not be less than one-half the sum of their diameters.

(e) [2-2.2.5] When tanks are in a diked area containing Class I or Class II liquids, or in the drainage path of Class I or Class II liquids, and are compacted in 3 or more rows or in an irregular pattern, greater spacing or other means may be required by the authority having jurisdiction to make tanks in the interior of the pattern accessible for fire fighting purposes.

TABLE 8.19-7
Minimum Tank Spacing (Shell-to-Shell)

	Floating Roof Tanks	Fixed Roof Tanks	
		Class I or II Liquids	Class IIIA Liquids
All tanks not over 150 feet diameter	1/6 sum of adjacent tank diameters, but not less than 3 feet	1/6 sum of adjacent tank diameters, but not less than 3 feet	1/6 sum of adjacent tank diameters, but not less than 3 feet
Tanks larger than 150 feet diameter			
If remote impounding is in accordance with sub.(4) (b)	1/6 sum of adjacent tank diameters	1/4 sum of adjacent tank diameters	1/6 sum of adjacent tank diameters
If impounding is around tanks in accordance with sub. (4) (c)	1/4 sum of adjacent tank diameters	1/3 sum of adjacent tank diameters	1/4 sum of adjacent tank diameters

(f) [2-2.2.6] The minimum horizontal separation between an LP gas container and a Class I, Class II or Class IIIA liquid storage tank shall be 20 feet, except in the case of Class I, Class II or Class IIIA liquid tanks operating at pressures exceeding 2.5 psig or equipped with emergency venting which will permit pressures to exceed 2.5 psig in which case the provisions of par. (a) and (b) shall apply. Suitable means shall be taken to prevent the accumulation of Class I, Class II or Class IIIA liquids under adjacent LP gas containers such as by dikes, diversion curbs or grading. When flammable or combustible liquid storage tanks are within a diked area, the LP gas containers shall be outside the diked area and at least 10 feet away from the center line of the wall of the diked area. The foregoing provisions shall not apply when LP gas containers of 125 gallons or less capacity are installed adjacent to fuel oil supply tanks of 660 gallons or less capacity. No horizontal separation is required between aboveground LP gas containers and underground flammable and combustible liquid tanks installed in accordance with s. Ind 8.21.

(4) [2-2.3] CONTROL OF SPILLAGE FROM ABOVEGROUND TANKS. (a) [2-2.3.1] Facilities shall be provided so that any accidental discharge of any Class I, II or IIIA liquids will be prevented from endangering important facilities, adjoining property, or reaching waterways, as provided for in par. (b) or (c). Tanks storing Class IIIB liquids do not require special drainage or diking provisions for fire protection purposes.

(b) [2-2.3.2] Remote Impounding. Where protection of adjoining property or waterways is by means of drainage to a remote impounding area, so that impounded liquid will not be held against tanks, such systems shall comply with the following:

1. A slope of not less than 1 percent away from the tank shall be provided for at least 50 feet toward the impounding area;

2. The impounding area shall have a capacity not less than that of the largest tank that can drain into it;

3. The route of the drainage system shall be so located that, if the liquids in the drainage system are ignited, the fire will not seriously expose tanks or adjoining property; and

4. The confines of the impounding area shall be located so that when filled to capacity the liquid level will not be closer than 50 feet from any property line that is or can be built upon, or from any tank.

(c) [2-2.3.3] Impounding Around Tanks by Diking. When protection of adjoining property or waterways is by means of impounding by diking around the tanks, such system shall comply with the following:

1. A slope of not less than 1 percent away from the tank shall be provided for at least 50 feet or to the dike base, whichever is less;

2. The volumetric capacity of the diked area shall not be less than the greatest amount of liquid that can be released from the largest tank within the diked area, assuming a full tank. To allow for volume occupied by tanks, the capacity of the diked area enclosing more than one tank shall be calculated after deducting the volume of the tanks, other than the largest tank, below the height of the dike;

3. To permit access, the outside base of the dike at ground level shall be no closer than 10 feet to any property line that is or can be built upon;

4. Walls of the diked area shall be of earth, steel, concrete or solid masonry designed to be liquidtight and to withstand a full hydrostatic head. Earthen walls 3 feet or more in height shall have a flat section at the top of not less than 2 feet wide. The slope of an earthen wall shall be consistent with the angle of repose of the material of which the wall is constructed. Diked areas for tanks containing Class I liquids located in extremely porous soils shall require special treatment to prevent seepage of hazardous quantities of liquids to low-lying areas or waterways in case of spills;

5. Except as provided in subd. 6. a., the walls of the diked area shall be restricted to an average interior height of 6 feet above interior grade;

6. Dikes may be higher than an average of 6 feet above interior grade where provisions are made for normal access and necessary emergency access to tanks, valves and other equipment, and safe egress from the diked enclosure;

a. Where the average height of the dike containing Class I liquids is over 12 feet high, measured from interior grade, or where the distance between any tank and the top inside edge of the dike wall is less than the height of the dike wall, provisions shall be made for normal operation of valves and for access to tank roof without entering below the top of the dike. These provisions may be met through the use of remote operated valves, elevated walkways or similar arrangements.

b. Piping passing through dike walls shall be designed to prevent excessive stresses as a result of settlement or fire exposure.

c. The minimum distance between tanks and toe of the interior dike walls shall be 5 feet.

7. Each diked area containing 2 or more tanks shall be subdivided preferably by drainage channels or at least by intermediate curbs in order to prevent spills from endangering adjacent tanks within the diked area as follows:

a. When storing normally stable liquids in vertical cone roof tanks constructed with weak roof-to-shell seam or approved floating roof tanks or when storing crude petroleum in producing areas in any type of tank, one subdivision for each tank in excess of 10,000 barrels and one subdivision for each group of tanks, with no tank exceeding 10,000 barrels capacity, having an aggregate capacity not exceeding 15,000 barrels.

b. When storing normally stable liquids in tanks not covered in par. (a), one subdivision for each tank in excess of 100,000 gallons (2,500 barrels) and one subdivision for each group of tanks, with no tank exceeding 100,000 gallons capacity, having an aggregate capacity not exceeding 150,000 gallons (3,570 barrels).

c. When storing unstable liquids in any type of tank, one subdivision for each tank except that tanks installed in accordance with drainage requirements approved by the department, shall require no additional subdivision. Since unstable liquids will react more rapidly when heated than when at ambient temperatures, subdivision by drainage channels is the preferred method.

d. Whenever 2 or more tanks storing Class I liquids, any one of which is over 150 feet in diameter, are located in a common diked area, intermediate dikes shall be provided between adjacent tanks to hold at least 10 percent of the capacity of the tank so enclosed, not including the volume displaced by the tank.

e. The drainage channels or intermediate curbs shall be located between tanks so as to take full advantage of the available space with due regard for the individual tank capacities. Intermediate curbs, where used, shall be not less than 18 inches in height.

8. Where provision is made for draining water from diked areas, such drains shall be controlled in a manner so as to prevent flammable or combustible liquids from entering natural water courses, public sewers, or public drains, if their presence would constitute a hazard. Control of drainage shall be accessible under fire conditions from outside the dike; and

9. Storage of combustible materials, empty or full drums or barrels, shall not be permitted within the diked area.

(5) [2-2.4] NORMAL VENTING FOR ABOVEGROUND TANKS. (a) [2-2.4.1] Atmospheric storage tanks shall be adequately vented to prevent the development of vacuum or pressure sufficient to distort the roof of a cone roof tank or exceeding the design pressure in the case of other atmospheric tanks, as a result of filling or emptying, and atmospheric temperature changes.

(b) [2-2.4.2] Normal vents shall be sized either in accordance with standards approved by the department or shall be at least as large as the filling or withdrawal connection, whichever is larger, but in no case less than 1-1/4 inch nominal inside diameter.

(c) [2-2.4.3] Low-pressure tanks and pressure vessels shall be adequately vented to prevent development of pressure or vacuum, as a result of filling or emptying and atmospheric temperature changes, from exceeding the design pressure of the tank or vessel. Protection shall also be provided to prevent overpressure from any pump discharging into the tank or vessel when the pump discharge pressure can exceed the design pressure of the tank or vessel.

(d) [2-2.4.4] If any tank or pressure vessel has more than one fill or withdrawal connection and simultaneous filling or withdrawal can be made, the vent size shall be based on the maximum anticipated simultaneous flow.

(e) [2-2.4.5] The outlet of all vents and vent drains on tanks equipped with venting to permit pressures exceeding 2.5 psig shall be arranged to discharge in such a way as to prevent localized overheating of, or flame impingement on, any part of the tank, in the event vapors from such vents are ignited.

(f) [2-2.4.6] Tanks and pressure vessels storing Class IA liquids shall be equipped with venting devices which shall be normally closed except when venting to pressure or vacuum conditions. Tanks and pressure vessels storing Class IB and IC liquids shall be equipped with venting devices which shall be normally closed except when venting under pressure or vacuum conditions, or with listed flame arresters. Tanks of 3,000 barrels capacity or less containing crude petroleum in crude-producing areas, and outside aboveground atmospheric tanks under 1,000 gallons capacity containing other than Class IA liquids may have open vents.

(g) [2-2.4.7] Flame arresters or venting devices required in par. (f) may be omitted for IB and IC liquids where conditions are such that their use may, in case of obstruction, result in tank damage. Liquid properties justifying the omission of such devices include, but are not limited to, condensation, corrosiveness, crystallization, polymerization, freezing or plugging. When any of these conditions exist, consideration may be given to heating, use of devices employing special materials of construction, the use of liquid seals, or inerting.

(6) [2-2.5] EMERGENCY RELIEF VENTING FOR FIRE EXPOSURE FOR ABOVEGROUND TANKS. (a) [2-2.5.1] Except as provided in par. (b), every aboveground storage tank shall have some form of construction or device that will relieve excessive internal pressure caused by exposure to fires.

(b) [2-2.5.2] Tanks larger than 12,000 gallons capacity storing Class IIIB liquids and not within the diked area or the drainage path of Class I or Class II liquids do not require emergency relief venting.

(c) [2-2.5.3] In a vertical tank the construction referred to in par. (a) may take the form of a floating roof, lifter roof, a weak roof-to-shell seam, or other approved pressure relieving construction. The weak roof-to-shell seam shall be constructed to fail preferential to any other seam.

(d) [2-2.5.4] Where entire dependence for emergency relief is placed upon pressure relieving devices, the total venting capacity of both normal and emergency vents shall be enough to prevent rupture of the shell or bottom of the tank if vertical, or of the shell or heads if horizontal. If unstable liquids are stored, the effects of heat or gas resulting from polymerization, decomposition, condensation, or self-reactivity shall be taken into account. The total capacity of both normal and emergency venting devices shall be not less than that derived from Table 8.19-8 except as provided in par. (f) or (g). Such device may be a self-closing manhole cover, or one using long bolts that permit the cover to lift under internal pressure, or an additional or larger relief valve or valves. The wetted area of the tank shall be calculated on the basis of 55 percent of the total exposed area of a sphere or spheroid, 75 percent of the total exposed area of a horizontal tank and the first 30 feet abovegrade of the exposed shell area of a vertical tank.

TABLE 8.19-8
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	200	211,000	1,000	524,000
30	31,600	250	239,000	1,200	557,000
40	42,100	300	265,000	1,400	587,000
50	52,700	350	288,000	1,600	614,000
60	63,200	400	312,000	1,800	639,000
70	73,700	500	354,000	2,000	662,000
80	84,200	600	392,000	2,400	704,000
90	94,800	700	428,000	2,800	742,000
100	105,000	800	462,000	and over	
120	126,000	900	493,000		
140	147,000	1,000	524,000		
160	168,000				
180	190,000				
200	211,000				

*Interpolate for intermediate values.

TABLE 8.19-9
Wetted Area Versus Cubic Free Air Per Hour
Wetted Area Over 2,800 Sq. Ft. and Pressures Over 1 psig
(14.7 psia and 60° F.)

Sq. Ft.	CFH	Sq. Ft.	CFH
2,800	742,000	9,000	1,930,000
3,000	786,000	10,000	2,110,000
3,500	892,000	15,000	2,940,000
4,000	995,000	20,000	3,720,000
4,500	1,100,000	25,000	4,470,000
5,000	1,250,000	30,000	5,190,000
6,000	1,390,000	35,000	5,900,000
7,000	1,570,000	40,000	6,570,000
8,000	1,760,000		

(e) [2-2.5.5] For tanks and storage vessels designed for pressures over 1 psig, the total rate of venting shall be determined in accordance with Table 8.19-8 except that when the exposed wetted area of the surface is greater than 2,800 sq. ft., the total rate of venting shall be in accordance with Table 8.19-9 or calculated by the following formula:

$$CFH = 1,107 A^{0.82}$$

Where CFH = venting requirement, in cubic feet of free air per hour.

A = exposed wetted surface, in square feet.

The foregoing formula is based on $Q = 21,000 A^{0.82}$, where Q = the amount of heat transferred.

(f) [2-2.5.6] The total emergency relief venting capacity for any specific stable liquid can be determined by the following formula:

$$\text{Cubic feet of free air per hour} = V = \frac{1,337}{LM}$$

V = cubic feet of free air per hour from Table 8.19-8.

L = latent heat of vaporization of specific liquid in Btu per lb.

M = molecular weight of specific liquids.

(g) [2-2.5.7] For tanks containing stable liquids, the required air-flow rate of par. (d) or (f) may be multiplied by the appropriate factor listed in the following schedule when protection is provided as indicated. Only one factor can be used for any one tank:

.5	for drainage in accordance with par. (4) (b) for tanks over 200 square feet of wetted area; or
.3	for water spray in accordance with standards approved by the department, and drainage in accordance with par. (4) (b); or
.3	for insulation in accordance with subpar. 1; or
.15	for water spray with insulation in accordance with subpar. 1. and drainage in accordance with par. (4) (b).

1. Insulation systems for which credit is taken shall meet the following performance criteria:

a. Remain in place under fire exposure conditions,

b. Withstand dislodgment when subjected to hose stream impingement during fire exposure except that this requirement may be waived where use of solid hose streams is not contemplated or would not be practical, and

c. Maintain a maximum conductance value of 4.0 Btu's per hour per square foot per degree F. (Btu/hr/sq ft/°F.) when the outer insulation jacket or cover is at a temperature of 1,660° F. and when the mean temperature of the insulation is 1,000° F.

(h) [2-2.5.8] The outlet of all vents and vent drains on tanks equipped with emergency venting to permit pressures exceeding 2.5 psig shall be arranged to discharge in such a way as to prevent localized overheating of or flame impingement on any part of the tank, in the event vapors from such vents are ignited.

(i) [2-2.5.9] Each commercial tank venting device shall have stamped on it the opening pressure, the pressure at which the valve reaches the full open position and the flow capacity at the latter pressure. If the start to open pressure is less than 2.5 psig and the pressure at full open position is greater than 2.5 psig, the flow capacity at 2.5 psig shall also be stamped on the venting device. The flow capacity shall be expressed in cubic feet per hour of air at 60° F. and 14.7 psia.

1. The flow capacity of tank venting devices under 8 inches in nominal pipe size shall be determined by actual test of each type and size of vent. These flow tests may be conducted by the manufacturer if certified by a qualified impartial observer, or may be conducted by a qualified, impartial outside agency. The flow capacity of tank venting devices 8 inches nominal pipe size and larger, including manhole covers with long bolts or equivalent, may be calculated provided that the opening pressure is actually measured, the rating pressure and corresponding free orifice area are stated, the word "calculated" appears on the nameplate, and the computation is based on a flow coefficient of 0.5 applied to the rated orifice area.

2. A suitable formula for this calculation is:

$$CFH = 1,667C_f A \sqrt{P_t - P_a}$$

where CFH = venting requirement in cubic feet of free air per hour

C_f = 0.5 [the flow coefficient]

A = the orifice area in sq. in.

P_f = the absolute pressure inside the tank in inches of water

P_a = the absolute atmospheric pressure outside the tank in inches of water

(7) [2-2.6] VENT PIPING FOR ABOVEGROUND TANKS. (a) [2-2.6.1] Vent piping shall be constructed in accordance with subch. 5.

(b) [2-2.6.2] Where vent pipe outlets for tanks storing Class I liquids are adjacent to buildings or public ways, they shall be located so that the vapors are released at a safe point outside of buildings and not less than 12 feet above the adjacent ground level. In order to aid their dispersion, vapors shall be discharged upward or horizontally away from closely adjacent walls. Vent outlets shall be located so that flammable vapors will not be trapped by eaves or other obstructions and shall be at least 5 feet from building openings.

(c) [2-2.6.3] The manifolding of tank vent piping shall be avoided except where required for special purposes such as vapor recovery, vapor conservation or air pollution control. When tank vent piping is manifolderd, pipe sizes shall be such as to discharge, within the pressure limitations of the system, the vapors they may be required to handle when manifolderd tanks are subject to the same fire exposure.

(d) [2-2.6.4] Vent piping for tanks storing Class I liquids shall not be manifolderd with vent piping for tanks storing Class II or Class III liquids unless positive means are provided to prevent the vapors from Class I liquids from entering tanks storing Class II or Class III liquids, to prevent contamination and possible change in classification of the less volatile liquid.

(8) ABOVEGROUND TANK OPENINGS OTHER THAN VENTS. (a) Connections. Connections for all tank openings shall be vapor and liquidtight.

(b) External Tank Valves. Each connection to an aboveground tank storing flammable or combustible liquids, located below normal liquid level, shall be provided with an external control valve located as close as practicable to the shell of the tank.

(c) Emergency Internal Valves. 1. An emergency internal valve at each piping connection to any tank below the normal liquid level shall be provided in addition to any normal valves.

2. The valve shall be effective inside the tank shell and shall be operated both manually and by a heat actuated device, which will automatically close the valve in case of fire to prevent the flow of liquid from the tank, even though the pipelines are broken from the tank.

3. These valves shall be inspected and manually operated annually by the owner or operator.

4. Emergency internal valves shall not be required on the following:

a. Crude or residential tanks.

b. Tanks at refineries or tanks at terminals which are equipped with a swing line or where facilities are provided to transfer the contents of the tank to another tank in case of fire.

c. Tank openings with less than nominal 3/4 inch inside diameter.

d. On tanks installed prior to the effective date of this paragraph if the size of the opening makes it impractical to use an internal valve. In these cases, an external valve shall be used, provided the valve incorporates a shear section and is so installed that any undue strain beyond the valve will not cause failure between the valve and the tank. Any enlargement of opening in tank will require installation of an internal valve.

(d) Combination Valves. The use of one valve to fulfill the requirements of par. (b) or (c) shall be permissible provided the combination valve affords manual control equivalent to that of the external valve and provides effective closure inside the tank shell when the heat actuated control device functions.

(e) Closure of Openings. 1. Each connection below the liquid level through which liquid does not normally flow shall be provided with liquidtight closure. This may be a valve, plug or blind, or a combination of these.

2. Openings for gauging shall be provided with a vapor tight cap or cover.

(f) Nonstatic Electricity Generating Fill Pipes. For Class IA, IB and IC liquids other than crude oils and asphalts, the fill pipe shall be so designed and installed as to minimize the possibility of generating static electricity. A fill pipe entering the top of a tank shall terminate within 6 inches of the bottom of the tank and shall be installed to avoid excessive vibration.

(g) 1. Filling and emptying connections for Class I, Class II and Class IIIA liquids which are made and broken shall be located outside of buildings at a location free from any source of ignition and not less than 5 feet away from any building opening.

2. Such connections for any liquid shall be closed and liquidtight when not in use and shall be properly identified.

Ind 8.195 LABELED TANKS. Aboveground tanks for Class I liquids, other than at refineries, or marine or pipeline terminals shall have painted conspicuously thereon in letters at least 5 inches high, the wording "FLAMMABLE - KEEP FIRE AWAY".

Ind 8.20 TANKS NOT IN USE. (1) ABANDONED OR OUT OF SERVICE TANKS. Aboveground tanks temporarily out of service or abandoned shall be equipped with valves and vents in accordance with s. Ind 8.19 or made gas free and have pipe plugs installed in all tank openings. Written notice to the local fire authority shall be given when tanks are rendered temporarily out of service.

(2) TANK REMOVAL. If tanks are not put back into use after a 12 month period, tanks shall be removed from the location.

Ind 8.205 [2-3] INSTALLATION OF UNDERGROUND TANKS. (1) GENERAL. The use of rivited or caulked tanks for underground storage shall be prohibited.

(2) [2-3.1] LOCATION. Excavation for underground storage tanks shall be made with due care to avoid undermining of foundations of existing structures. Underground tanks or tanks under buildings shall be so located with respect to existing building foundations and supports that the loads carried by the latter cannot be transmitted to the tank. The distance from any part of a tank storing Class I, Class II or Class III liquids to the nearest wall of any basement or pit shall be not less than 1 foot, and to any property line that can be built upon, not less than 3 feet.

(3) [2-3.2] BURIAL DEPTH AND COVER. (a) [2-3.2.1] Steel underground tanks shall be set on firm foundations and surrounded with at least 6 inches of clean sand or pea gravel well-tamped in place. The tank shall be placed in the hole with care, since dropping or rolling the tank into the hole can break a weld, puncture or damage the tank, or scrape off the protective coating of coated tanks.

(b) [2-3.2.2] Steel underground tanks shall be covered with a minimum of 2 feet of earth, or shall be covered with not less than one foot of earth, on top of which shall be placed a slab of reinforced concrete not less than 4 inches thick. When they are, or are likely to be, subjected to traffic, they shall be protected against damage from vehicles passing over them by at least 3 feet of earth cover, or 18 inches of well-tamped earth plus either 6 inches of reinforced concrete or 8 inches of asphaltic concrete. When asphaltic or reinforced concrete paving is used as part of the protection, it shall extend at least 1 foot horizontally beyond the outline of the tank in all directions.

(c) [2-3.2.3] Nonmetallic underground tanks shall be installed in accordance with the manufacturer's instructions. The minimum depth of cover shall be as specified in par. (b) for steel tanks.

(d) [2-3.2.4] For tanks built in accordance with s. Ind 8.18 (3) (a), the burial depth shall be such that the static head imposed at the bottom of the tank will not exceed 10 psig if the fill or vent pipe is filled with liquid. If the depth of cover is greater than the tank diameter, the tank manufacturer shall be consulted to determine if reinforcement is required.

(4) [2-3.3] CORROSION PROTECTION. Unless tests show that soil resistivity is 10,000 ohm-centimeters or more, and there are no other corrosive conditions, tanks and their piping shall be protected by either:

(a) A properly installed and maintained cathodic protection system with or without coatings, or

(b) Corrosion resistant materials of construction such as special alloys, fiber glass reinforced plastic, or fiber glass reinforced plastic coatings, or equivalent approved system. Selection of the type of protection to be employed shall be based upon the corrosion history of the area and the judgment of a qualified engineer.

(5) [2-3.5] VENTS FOR UNDERGROUND TANKS. (a) [2-3.5.1] Location and Arrangement of Vents for Class I Liquids. Vent pipes from underground storage tanks storing Class I liquids shall be so located that the discharge point is outside of buildings, higher than the fill pipe opening, and not less than 12 feet above the adjacent ground level. Vent pipes shall not be obstructed by devices provided for vapor recovery or other purposes unless the tank and associated piping and equipment are otherwise protected to limit back-pressure development to less than the maximum working pressure of the tank and equipment by the provision of pressure-vacuum vents, rupture discs or other tank venting devices installed in the tank vent lines. Vent outlets and devices shall be protected to minimize the possibility of blockage from weather, dirt or insect nests, and shall be so located and directed that flammable vapors will not accumulate or travel to an unsafe location, enter building openings or be trapped under eaves. Tanks containing Class IA liquids shall be equipped with pressure and vacuum venting devices which shall be normally closed except when venting under pressure or vacuum conditions. Tanks storing Class IB or Class IC liquids shall be equipped with pressure-vacuum vents or with listed flame arresters. Tanks storing gasoline are exempt from the requirements for pressure and vacuum venting devices, except as required to prevent excessive back pressure, or flame arresters, provided the vent does not exceed 3 inches nominal inside diameter.

(b) [2-3.5.2] Vent Capacity. Tank venting systems shall be provided with sufficient capacity to prevent blowback of vapor or liquid at the fill opening while the tank is being filled. Vent pipes shall not be less than 1-1/4 inch nominal inside diameter. The required venting capacity depends upon the filling or withdrawal rate, whichever is greater, and the vent line length. Unrestricted vent piping sized in accordance with Table 8.205-1 will prevent back-pressure development in tanks from exceeding 2.5 psig. Where tank venting devices are installed in vent lines, their flow capacities shall be determined in accordance with s. Ind 8.19 (6) (i).

Table 8.205-1
Vent Line Diameters

Maximum Flow GPM	Pipe Length*		
	50 Ft.	100 ft.	200 Ft.
100	1-1/4 inch	1-1/4 inch	1-1/4 inch
200	1-1/4 inch	1-1/4 inch	1-1/4 inch
300	1-1/4 inch	1-1/4 inch	1-1/2 inch
400	1-1/4 inch	1-1/2 inch	2 inch
500	1-1/2 inch	1-1/2 inch	2 inch
600	1-1/2 inch	2 inch	2 inch
700	2 inch	2 inch	2 inch
800	2 inch	2 inch	3 inch
900	2 inch	2 inch	3 inch
1000	2 inch	2 inch	3 inch

*Vent lines of 50 ft., 100 ft. and 200 ft. of pipe plus 7 ells.

(c) [2-3.5.3] Location and Arrangement of Vents for Class II or Class IIIA Liquids. Vent pipes from tanks storing Class II or Class IIIA liquids shall terminate outside of building and higher than the fill pipe opening. Vent outlets shall be above normal snow level. They may be fitted with return bends, coarse screens or other devices to minimize ingress of foreign material.

(d) [2-3.5.4] Vent piping shall be constructed in accordance with subch. 3. Tank vent pipes and vapor return piping shall be installed without sags or traps in which liquid can collect. Condensate tanks, if utilized, shall be installed and maintained so as to preclude the blocking of the vapor return piping by liquid. The vent pipes and condensate tanks shall be located so that they will not be subjected to physical damage. The tank end of the vent pipe shall enter the tank through the top.

(e) [2-3.5.5] When tank vent piping is manifolded, pipe sizes shall be such as to discharge, within the pressure limitations of the system, the vapors they can be required to handle when manifolded tanks are filled simultaneously. Float-type check valves installed in tank openings connected to manifolded vent piping to prevent product contamination may be used provided that the tank pressure will not exceed that permitted by s. Ind 8.205 (3) (d).

1. 'Exception'. For service stations, the capacity of manifolded vent piping shall be sufficient to discharge vapors generated when 2 manifolded tanks are simultaneously filled.

(f) [2-3.5.6] Vent piping for tanks storing Class I liquids shall not be manifolded with vent piping for tanks storing Class II or Class III liquids.

(6) UNDERGROUND TANK OPENINGS OTHER THAN VENTS. (a) Connections. Connections for all tank openings shall be vapor- or liquid-tight.

(b) Openings for Manual Gauging. 1. Openings for manual gauging, if independent of the fill pipe, shall be provided with a vapor-tight cap or cover.

2. If inside a building, each such opening shall be protected against liquid overflow and possible vapor release by means of a spring-loaded check valve or other approved device.

(c) [2-3.6.3] Fill and Discharge Lines. Fill and discharge lines shall enter tanks only through the top. Fill lines shall be sloped toward the tank. Underground tanks for Class I liquids having a capacity of more than 1,000 gallons shall be equipped with a tight fill device for connecting the fill hose to the tank.

(d) Fill Pipes - Nonstatic Electricity Generating. For Class IA, IB and IC liquids other than crude oils, and asphalts, the fill pipe shall be so designed and installed as to minimize the possibility of generating static electricity by terminating within 6 inches of the bottom of the tank.

(e) Location and Identification of Connections. Filling and emptying connections which are made and broken shall be located outside of buildings at a location free from any source of ignition and not less than 5 feet away from any building opening. Such connection shall be closed and liquid tight when not in use. The connection shall be properly identified.

(7) ANCHORAGE OF UNDERGROUND TANKS. Underground tanks shall be anchored where the tanks may become buoyant due to a rise in the level of the water table or due to location in an area that may be subjected to flooding.

Ind 8.21 COLLECTION SUMPS FOR UNDERGROUND TANKS. (1) APPLICATION.

Collection sumps shall be installed with all new or replacement underground tank installations.

(2) GENERAL. Collection sumps shall comply with Figure 8.21-1 and the following requirements:

(a) The sump hole shall be designed and located so as to facilitate interception of liquid leakage from the underground tank or tanks.

(b) The location of the sump hole shall be within one tank length of the tank or tanks in the direction of hydraulic underground flow, (i.e., down-gradient if such gradient can be readily determined). A single sump hold may serve up to 4 underground tanks.

(c) Sump hole systems shall be set below grade so that the bottom of collection device is at least 6 inches below the adjoining tank bottoms.

(d) Sump holes shall be constructed of a permanent casing pipe that is inert to flammable fuel and that resists corrosion underground.

Note: Ordinary plastic slitted drain tile does not satisfy the intent of this rule.

(e) The sump pipe shall be slitted or perforated from within one foot of the ground surface to within one foot of the bottom of the sump pipe to allow ground seepage to infiltrate.

(f) Slits or perforations shall be spaced vertically and located laterally around the sump pipe in a pattern that provides continuous vertical openings and infiltration into the sump regardless of the water table or seepage elevation.

(g) The sump pipe diameter shall be not less than 6 inches. The sump pipe shall be flush with the ground surface or with adjacent pavement and shall be fitted with a removable cover. A safety screen shall be placed in the sump pipe immediately below the cap to protect the sump when it is open. The cap or cover shall be provided with a center hole just large enough to pass the suction hose employed locally. A removable screen cover shall be provided for this hole.

(h) A clean pea gravel stone filter one to 2 feet thick shall be placed in the bottom of the sump pipe.

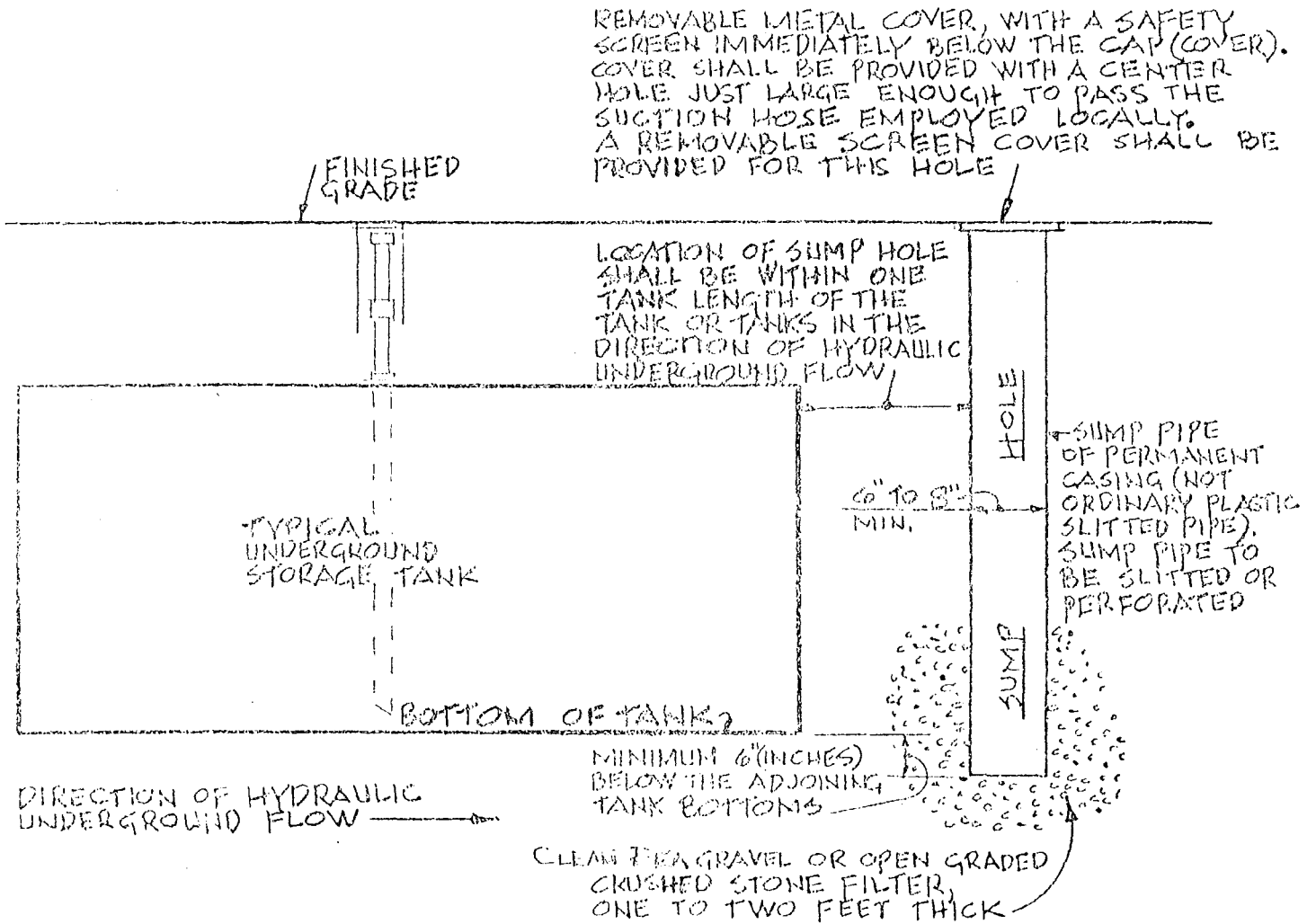
(i) The sump location and construction details shall be reviewed by the local fire prevention authority.

Ind 8.215 INSTALLATION OF TANKS INSIDE BUILDINGS. (1) CLASS I LIQUIDS.

(a) Tanks for storage of Class I flammable liquids shall not be installed inside buildings except as provided in subchs. 7 and 10.

(b) Tanks for storage of Class I flammable liquids may be installed under a building as an underground tank complying with the provisions of s. Ind 8.21.

Figure 8.21-1
Collection Sumps



(2) CLASS II AND III LIQUIDS. (a) Tanks or barrels with aggregate capacity of 1,320 gallons or less shall be located in an enclosure as required by ss. Ind 54.14, Ind 55.29, Ind 56.15, Ind 57.14, Ind 58.24, Ind 59.21, Ind 62.32, and Ind 62.46, Wis. Adm. Code.

(b) Tanks larger than 60 gallons capacity shall not be located in buildings above the lowest story, cellar or basement, except in industrial or processing plants where storage on a higher floor is required by the process.

(c) Tanks exceeding 660 gallons individual capacity or 1,320 gallons aggregate capacity in an individual building or in a section of a building separated by fire walls shall be installed in an enclosure constructed as follows:

1. Floors, walls and ceilings of 4 hour fire resistive rated construction;
2. Walls bonded to floor and ceiling; and
3. Opening protected by 3 hour labeled fire door assemblies and 6 inch liquid tight sills or ramps.

(d) 1. The nominal gross capacity of tanks located in buildings of types one and two fire resistive construction shall not exceed 15,000 gallons.

2. The nominal gross capacity of tanks located in buildings of type 5 - exterior masonry, or type 6 - metal frame unprotected construction as specified in s. Ind 51.03, Wis. Adm. Code, shall not exceed 10,000 gallons.

3. The nominal gross capacity of tanks located in buildings of any class of construction, shall not exceed 50,000 gallons, with an individual tank capacity not exceeding 25,000 gallons provided such tanks are located in a 2-hour rated fire-resistive or detached room, cut off both vertically and horizontally from the remainder of the building in a manner acceptable to the department or authorized deputy.

(3) VENTS. Vents for tanks inside of buildings shall conform to the requirements for vents on outside aboveground tanks and for underground tank vents serving Class I liquids, except that emergency venting by the use of weak roof seams on tanks shall not be permitted. Vents shall discharge vapors outside the buildings.

(4) VENT PIPING. Vent piping shall be constructed in accordance with subch. 5.

(5) TANK OPENINGS OTHER THAN VENTS. (a) Connections for all tank openings shall be vapor or liquid tight.

(b) Each connection to a tank inside of buildings through which liquid can normally flow shall be provided with an internal or an external valve located as close as practical to the shell of the tank.

1. Such valves, when external, and their connections to the tank shall be of steel except when the chemical characteristics of the liquid stored are incompatible with steel.

2. When materials other than steel are necessary, they shall be suitable for the pressures, structural stresses and temperatures involved, including fire exposures.

(c) Flammable or combustible liquid tanks located inside of buildings, except in one-story buildings designed and protected for flammable or combustible liquid storage, shall be provided with an automatic closing heat actuated valve on each withdrawal connection below the liquid level to prevent continued flow in the event of fire in the vicinity of the tank.

1. 'Exception'. Connections for emergency disposal need not comply with this requirement.

(d) Valves specified in par. (c) may be incorporated in the valves required by par. (b) or shall be located adjacent to the valves required by par. (b).

(e) Openings for manual gauging, if independent of the fill pipe, shall be provided with a vapor tight cap or cover. Each such opening shall be protected against liquid overflow and possible vapor release by means of a spring loaded check valve or other approved device.

(f) For Class IB and Class IC liquids other than crude oils, and asphalts, the fill pipe shall be so designed and installed as to minimize the possibility of generating static electricity by terminating within 6 inches of the bottom of the tank.

(g) The fill pipe inside of the tank shall be installed to avoid excessive vibration of the pipe.

(h) The inlet of the fill pipe shall be located outside of buildings at a location free from any source of ignition and not less than 5 feet away from any building opening. The inlet of the fill pipe shall be closed and liquid tight when not in use. The fill connection shall be properly identified.

(i) Tanks inside buildings shall be equipped with a device, or other means shall be provided, to prevent overflow into the building.

(j) Inside storage tanks for Class III flammable liquids shall be provided with draw-off or drain openings. Tanks shall be installed so that the bottom pitches to the draw-off or drain openings at a slope of not less than 1/4 inch per foot of length. The draw-off or drain opening shall be provided with suitable connection to provide a sump from which water or sediment can be readily drained.

Ind 8.22 [2-5] SUPPORTS, FOUNDATIONS AND ANCHORAGE FOR ALL TANK LOCATIONS. (1) [2-5.1] GENERAL. Tanks shall rest on the ground or on foundations made of concrete, masonry, piling or steel. Tank foundations shall be designed to minimize the possibility of uneven settling of the tank and to minimize corrosion in any part of the tank resting on the foundation.

(2) [2-5.2] SUPPORTS ABOVE THE FOUNDATIONS. When tanks are supported above the foundations, tank supports shall be installed on firm foundations. Supports for tanks storing Class I, Class II or Class IIIA liquids shall be of concrete, masonry or protected steel. Single wood timber supports, not cribbing, laid horizontally may be used for outside aboveground tanks if not more than 12 inches high at their lowest point.

(3) [2-5.3] FIRE RESISTIVE PROTECTION. Steel supports or exposed piling for tanks storing Class I, Class II or Class IIA liquids shall be protected by materials having a fire resistance rating of not less than 2 hours, except that steel saddles need not be protected if less than 12 inches high at their lowest point.

(4) [2-5.4] SPECIAL TANK DESIGN. The design of the supporting structure for tanks, such as spheres shall require special engineering consideration.

(5) [2-5.5] PROTECTION OF TANK SHELL. Every tank shall be so supported as to prevent the excessive concentration of loads on the supporting portion of the shell.

(6) [2-5.6] TANKS SUBJECT TO FLOODING. Where a tank is located in an area that may be subjected to flooding, it shall comply with the provisions of s. Ind 8.26.

Ind 8.225 PROVISIONS FOR UNDERGROUND TANKS TEMPORARILY OUT OF SERVICE, ABANDONED OR REMOVED. Underground tanks to be taken out of service shall be safeguarded by placing in a "temporarily out of service" condition; abandoning in place with safeguards; removal; or by replacing with tanks stored aboveground. The owner or operator shall give written notice to the local fire authority upon placing tanks in a "temporarily out of service" condition.

(1) RENDERING TANKS "TEMPORARILY OUT OF SERVICE". Tanks shall be rendered "temporarily out of service" only when it is planned that they will be returned to active service at the location within 90 days. The owner may request an extension beyond the 90 days by submitting a written request to the local fire authority, for approval or denial. The following steps shall be carried out successively:

(a) Removal of all flammable or combustible liquids;

(b) Cap or plug the fill line, gauge opening, and pump suction, using appropriate sealing compound on pipe fittings. If fill line and gauge openings are equipped with caps which can be properly locked, the secure locking of these caps is sufficient; and

(c) Leave the vent line open.

(2) TANKS CONSIDERED ABANDONED. Tanks placed in a "temporarily out of service" condition for more than 90 days shall be considered abandoned and be subject to removal or abandonment in place according to the provisions of par. (c), unless an extension of time has been granted.

(3) ABANDONMENT OF UNDERGROUND TANKS IN PLACE. The following steps shall be carried out successively:

(a) Remove all flammable or combustibile liquid from the tank and from all connecting lines;

(b) Disconnect the suction, inlet, gauge and vent lines;

(c) Fill the tank completely with an inert solid material; and

(d) Cap remaining underground piping.

(4) RECORDS OF TANKS RENDERED "TEMPORARILY OUT OF SERVICE" OR ABANDONED. In cases where tanks are either rendered "temporarily out of service" or permanently abandoned, records shall be kept of tank size, location, date of abandonment and method used for placing the abandoned tank in a safe condition.

(5) REMOVAL OF UNDERGROUND TANKS. The following steps shall be taken successively:

(a) Remove all flammable liquid from the tank and from all connecting lines;

(b) Disconnect and remove insofar as possible the suction, inlet, gauge and vent lines;

(c) Cap or plug open ends of remaining lines; and

(d) Close all openings in the tank with pipe plugs before the tank is removed from the ground.

(6) REMOVED UNDERGROUND TANKS STORED ABOVEGROUND. The following steps shall be taken before tanks are stored:

(a) Remove all flammable liquid from tank;

(b) Flush the tank to overflowing with water or take necessary steps to make it gas free;

(c) Install pipe plugs in all openings; and

(d) If deemed necessary by the department, the tank storage area shall be enclosed with no less than 6 foot high industrial type fence to minimize trespassing or tampering.

(7) DISPOSAL OF TANKS. (a) If a tank is to be disposed of as junk, it shall be retested for flammable vapors, and, if necessary, rendered gas free.

(b) After junking and before releasing to junk dealer, a sufficient number of holes or openings should be made in it to render it unfit for further use.

(8) SAFETY PRECAUTIONS. No cutting torch or other flame or spark producing equipment shall be used until the tank has been completely purged or otherwise rendered safe.

Ind 8.23 REUSE OF UNDERGROUND TANKS. (1) OUT OF SERVICE LESS THAN 15 MONTHS. All tanks which have been placed "temporarily out of service" for more than 3 months (90 days) and less than 15 months shall be retested before being put back into service as specified in s. Ind 8.185.

(2) OUT OF SERVICE 15 MONTHS OR MORE. (a) All tanks which have been out of service for 15 months or more shall be tested aboveground and certified to be of sound construction and free of leaks before being put back in service.

(b) A copy of the certified test results shall be submitted to the local fire authority prior to the tank being put back in service.

Ind 8.235 REMOVAL OR DISMANTLING OF ABOVEGROUND STORAGE TANKS. The procedures for the removal or dismantling of aboveground field erected storage tanks shall be approved by the department.

Ind 8.24 LEAKING TANKS. Tanks found to be leaking shall be repaired, taken temporarily out of service, abandoned in place, or removed as provided in ss. Ind 8.225 and 8.23.

Ind 8.245 [2-6] SOURCES OF IGNITION. In locations where flammable or combustible vapors may be present, precautions shall be taken to prevent ignition by eliminating or controlling sources of ignition. Sources of ignition may include open flames, lightning, smoking, cutting and welding, hot surfaces, frictional heat, sparks (static, electrical and mechanical), spontaneous ignition, chemical and physical reactions and radiant heat.

Ind 8.25 [2-8] FIRE PROTECTION AND IDENTIFICATION. (1) [2-8.1] FIRE EXTINGUISHING SYSTEM. A fire extinguishing system in accordance with NFPA No. 13-1980 or other nationally recognized standard shall be provided or be available for vertical atmospheric fixed roof storage tanks larger than 50,000 gallons capacity storing Class I liquids if located in a congested area where there is an unusual exposure hazard to the tank from adjacent property or to adjacent property from the tank. Fixed roof tanks storing Class II or III liquids at temperatures below their flash points and floating roof tanks storing any liquid do not require protection, when installed in compliance with s. Ind 8.19.

(2) [2-8.2] APPLICATION. Identification of storage tanks containing liquids shall not be required except when the contents have a health or reactivity degree of hazard of 2 or more or a flammability rating of 4. The marking need not be applied directly to the tank but located where it can readily be seen, such as on the shoulder of an accessway or walkway to the tank or tanks or on the piping outside of the diked area. If more than one tank is involved, the markings shall be so located that each tank can readily be identified.

Ind 8.255 [2-9] PREVENTION OF OVERFILLING OF TANKS. Tanks receiving transfer of Class I liquids from mainline pipelines or marine vessels and located in an area where overfilling may endanger a place of habitation or public assembly shall be either:

(1) GAGING. Gaged at frequent intervals while receiving transfer of product and communications maintained with mainline pipeline or marine personnel so that flow can be promptly shut down or diverted; or

(2) WARNING TO EMPLOYEES. Equipped with an independent high level alarm located where personnel are on duty during the transfer and can promptly arrange for flow stoppage or diversion; or

(3) AUTOMATIC SHUT DOWN. Equipped with an independent high level alarm system that will automatically shut down or divert flow.

Ind 8.26 TANKS IN LOCATIONS THAT MAY BE FLOODED. (1) SCOPE. The provisions of this section shall apply to tanks containing flammable or combustible liquids that may become buoyant due to a rise in the level of the water table or due to their location in an area that may be subjected to flooding.

(2) [2-5.6.1.1] ABOVEGROUND VERTICAL STORAGE TANKS. Each vertical tank shall be located so that its top extends above the maximum flood stage by at least 30 percent of its allowable storage capacity.

(3) [2-5.6.1.2] ABOVEGROUND HORIZONTAL STORAGE TANKS. Horizontal tanks located so that more than 70 percent of the tank's storage capacity will be submerged at the established flood stage shall be anchored; attached to a foundation of concrete or of steel and concrete of sufficient weight to provide adequate load for the tank when filled with flammable or combustible liquid and submerged by flood water to the established flood stage; or adequately secured from floating by other means. Tank vents or other openings which are not liquidtight shall be extended above maximum flood stage water level.

(4) [2-5.6.1.3] WATER SUPPLY. A dependable water supply shall be available for filling an empty or partially filled tank, except that where filling the tank with water is impractical or hazardous because of the tank's contents, tanks shall be protected by other means against movement or collapse.

(5) [2-5.6.1.4] OTHER TYPES OF ABOVEGROUND STORAGE TANKS. Spherical or spheroid tanks shall be protected by applicable methods as specified for either vertical or horizontal tanks.

(6) [2-5.6.2] UNDERGROUND TANKS. (a) [2-5.6.2.1] At locations where there is an ample and dependable water supply available, underground tanks containing flammable or combustible liquids, so placed that more than 70 percent of their storage capacity will be submerged at the maximum flood stage, shall be so anchored, weighted or secured as to prevent movement when filled or loaded with water and submerged by flood water to the established flood stage. Tank vents or other openings which are not liquidtight shall be extended above maximum flood stage water level.

(b) [2-5.6.2.2] At locations where there is no ample and dependable water supply or where filling of underground tanks with water is impractical because of the contents, each tank shall be safeguarded against movement when empty, and submerged by high ground water or flood water by anchoring or by securing by other means. Each such tank shall be so constructed and installed that it will safely resist external pressures if submerged.

(7) PIPE CONNECTIONS. Pipe connections below the allowable liquid level in a tank shall be provided with valves or cocks located as closely as practicable to the tank shell. Such valves and their connections to tanks shall be of steel or other material suitable for use with the liquid being stored. Cast iron shall not be permitted.

(8) INDEPENDENT WATER SUPPLY FACILITIES. (a) At locations where an independent water supply is required, it shall be entirely independent of public power and water supply. Independent source of water shall be available when flood waters reach a level not less than 10 feet below the bottom of the lowest tank on a property.

(b) The self-contained power and pumping unit shall be so located or so designed that pumping into tanks may be carried on continuously throughout the rise in flood waters from a level 10 feet below the lowest tank to the level of the potential flood stage.

(c) Capacity of the pumping unit shall be such that the rate of rise of water in all tanks shall be equivalent to the established potential average rate of rise of flood waters at any stage.

(d) Each independent pumping unit shall be tested periodically to insure that it is in satisfactory operating condition.

(9) STRUCTURAL GUIDES. (a) Structural guides for holding floating tanks above their foundations shall be so designed that there will be no resistance to the free rise of a tank, and shall be constructed of noncombustible material.

(b) The strength of the structure shall be adequate to resistant lateral movement of a tank subject to a horizontal force in any direction equivalent to not less than 25 pounds per square foot acting on the projected vertical cross-sectional area of the tank.

(c) Where tanks are situated on exposed points or bends in a shore line where swift currents in flood waters will be present, the structures shall be designed to withstand a unit force of not less than 50 pounds per square foot.

(10) [2-5.6.3] WATER LOADING. (a) The filling of a tank to be protected by water loading shall be started as soon as flood waters are predicted to reach a dangerous flood stage.

(b) Where independently fueled water pumps are relied upon, sufficient fuel shall be available at all times to permit continuing operations until all tanks are filled.

(c) Tank valves shall be closed and locked in closed position when water loading has been completed.

(11) FLOATING TANKS. (a) Where structural guides are provided for the protection of floating tanks, all rigid connections between tanks and pipelines shall be disconnected and blanked off or blinded before the flood waters reach the bottom of the tank, unless control valves and their connections to the tank are of a type designed to prevent breakage between the valve and the tank shell.

(b) All valves attached to tanks other than those used in connection with water loading operations shall be closed and locked.

(c) If a tank is equipped with a swing line, the swing pipe shall be raised to and secured at its highest position.

(12) INSPECTIONS. Periodic inspections of all plants where the tanks are subject to flooding, shall be made to assure the following:

(a) That all flammable and combustible liquid storage tanks are in compliance with these requirements and so maintained;

(b) That detailed printed instructions of what to do in flood emergencies are properly posted; and

(c) That station operators and other employees depended upon to carry out such instructions are thoroughly informed as to the location and operation of such valves and other equipment necessary to effect the intent of these requirements.

(13) [2-5.6.4] OPERATING INSTRUCTIONS. (a) [2-5.6.4.1] Operating instructions or procedures to be followed in a flood emergency shall be readily available.

(b) [2-5.6.4.2] Personnel relied upon to carry out flood emergency procedures shall be informed of the location and operation of valves and other equipment necessary to effect the intent of these requirements.

(14) [2-10] LEAKAGE DETECTION AND INVENTORY RECORDS FOR UNDERGROUND TANKS. Accurate inventory records or a leak detection program shall be maintained on all Class I liquid storage tanks for indication of possible leakage from the tanks or associated piping.

SUBCHAPTER 5 PIPES, VALVES AND FITTINGS

Ind 8.27 PRESSURES AND STRESSES. (1) GENERAL. The design including selection of materials, fabrication, assembly, test and inspection of piping systems containing flammable or combustible liquids shall be suitable for the expected working pressures and structural stresses in accordance with nationally recognized standards.

(2) EXCEPTIONS. The following applications are excepted from the provisions of subs. (1):

(a) Tubing or casing on any oil or gas wells and any piping connected directly thereto;

(b) Motor vehicle, aircraft, boat or portable or stationary engine;

(c) Piping within the scope of any applicable boiler and pressure vessel code; and

(d) Pipeline systems operating between or within refineries, boat or barge docks, marine terminals or pipeline terminals, or tank farm storage adjunctive thereto.

Ind 8.275 MATERIALS. (1) APPLICATION. Steel and nodular iron materials for piping, valves or fittings shall be steel or nodular iron conforming to standards acceptable to the department, except as provided in subs. (2) and (3).

(2) MATERIALS OTHER THAN STEEL. (a) Material other than steel or nodular iron shall be designed to specifications recognized as good engineering design for the material used and shall be approved by the department.

(b) Materials other than steel or nodular iron may be used underground if required by the properties of the flammable or combustible liquid handled.

(3) PIPE LININGS. Piping valves and fittings may have combustible or non-combustible linings.

Note: When low melting point materials such as aluminum and brass or materials that soften on fire exposure, such as plastics, or nonductile materials, such as cast iron, are used, special consideration should be given to their behavior on fire exposure. If such materials are used in aboveground piping systems or inside buildings, they should be suitably protected against fire exposure or so located that any spill resulting from the failure of these materials could not unduly expose persons, important buildings or structures or can be readily controlled by remote valves.

Ind 8.28 PIPE JOINTS. (1) TYPE OF JOINTS. (a) Welded or threaded metal connectors shall be used.

(b) Pipe joints dependent upon the friction or compression characteristics of either combustible or noncombustible materials for mechanical continuity of piping shall not be used.

(2) LIQUID TIGHT JOINTS. Joints shall be made liquid tight. Threaded joints and connections shall be made up tight with a suitable lubricant or piping compound and shall be maintained in a liquid tight condition.

Ind 8.285 [3-4.1] PIPING SYSTEM SUPPORTS. Piping systems shall be substantially supported and protected against physical damage and excessive stresses arising from settlement, vibration, expansion or contraction, by use of swing joints at underground tank and directly below dispensing unit. Supports for aboveground piping shall be of noncombustible material. The installation of nonmetallic piping shall be in accordance with the manufacturer's instructions.

Ind 8.29 [3-5] PROTECTION AGAINST CORROSION. [3-5.1] All piping for liquids, both aboveground and underground, where subject to external corrosion, shall be painted or otherwise protected.

Ind 8.295 [3-6] VALVES. Piping systems shall contain a sufficient number of valves to operate the system properly and to protect the plant. Piping systems in connection with pumps shall contain a sufficient number of valves to control properly the flow of liquid in normal operation and in the event of physical damage. Each connection to piping by which equipment such as tank cars, tank vehicles or marine vessels discharge liquids into storage tanks shall be provided with a check valve for automatic protection against back-flow if the piping arrangement is such that back-flow from the system is possible.

Ind 8.30 [3-7.1] TESTING. All piping before being covered, enclosed or placed in use shall be hydrostatically tested to 150 percent of the maximum anticipated pressure of the system, or pneumatically tested to 110 percent of the maximum anticipated pressure of the system, but not less than 5 pounds per square inch gage at the highest point of the system. This test shall be maintained for a sufficient time to complete visual inspection of all joints and connections, but for at least 10 minutes.

Ind 8.305 PUMPS AND PIPING. (1) MANIFOLDING AND CROSS-CONNECTIONS. In intraplant systems, pump or piping connected for handling Class I liquids shall not be so connected or manifolded as to permit their intermittent or alternate use for Class II or Class III liquids.

(2) IDENTIFICATION. The piping shall have a definite scheme of identification, such as stenciling, tagging or coloring of either the lines or the control valves or both to distinguish the type of product which is being carried by each line.

Note: See s. Ind 8.435 (1) for the standard color code for flammable and combustible liquids.

(3) PUMP VALVES. Pumps delivering to or taking suction from tanks or tank car shall be provided with a valve on both suction and discharge of pump.

(4) LIQUID TIGHT PUMPS. Pumps shall be maintained liquid tight.

(5) EXCEPTIONS. Provisions of this section do not apply to pipeline systems operation between or within refineries, boat or barge docks, marine terminals or pipeline terminals or tank farm storage adjunctive thereto.

SUBCHAPTER 6 CONTAINER AND PORTABLE TANK STORAGE

Ind 8.31 [4-1] SCOPE. (1) [4-1.1] APPLICATION. This subchapter shall apply to the storage of liquids, including flammable aerosols, in drums or other containers not exceeding 60 gallons individual capacity and portable tanks not exceeding 660 gallons individual capacity and limited transfers incidental thereto.

(2) [4-1.2] EXCEPTIONS. This section shall not apply to the following:

(a) Storage of containers in bulk plants, service stations, refineries, chemical plants and distilleries;

(b) Liquids in the fuel tanks of motor vehicles, aircraft, boats or portable or stationary engines;

(c) Beverages when packaged in individual containers not exceeding a capacity of one gallon;

(d) Medicines, foodstuffs, cosmetics and other consumer products containing not more than 50 percent by volume of water miscible liquids and with the remainder of the solution not being flammable when packaged in individual containers not exceeding one gallon in size;

(e) The storage of liquids that have no flash point up to the boiling point of the liquid, or up to a temperature at which the sample being tested shows an obvious physical change; and

(f) The storage of distilled spirits and wines in wooden barrels or casks.

(3) [4-1.3] UNSTABLE LIQUIDS AND FLAMMABLE AEROSOLS. For the purpose of this subchapter, unstable liquids and flammable aerosols shall be treated as Class IA liquids.

Ind 8.315 [4-2] DESIGN, CONSTRUCTION AND CAPACITY OF CONTAINERS. (1)

[4-2.1] CONTAINER DESIGN. Only approved containers and portable tanks shall be used. Metal containers and portable tanks meeting the requirements of, and containing products authorized by the department, shall be acceptable. Polyethylene containers and drums and plastic containers meeting the requirements of and containing products authorized by nationally recognized standards acceptable to the department shall be acceptable.

(2) [4-2.2] VENTING. Each portable tank shall be provided with one or more devices installed in the top with sufficient emergency venting capacity to limit internal pressure under fire exposure conditions to 10 psig, or 30 percent of the bursting pressure of the tank, whichever is greater. The total venting capacity shall be not less than that specified in s. Ind 8.19 (6) (d) or (6) (f). At least one pressure-actuated vent having a minimum capacity of 6,000 cubic feet of free air per hour (14.7 psia and 60° F.) shall be used. It shall be set to open at not less than 5 psig. If fusible vents are used, they shall be actuated by elements that operate at a temperature not exceeding 300 degrees F.

(a) Exception. When used for paints, drying oils and similar materials where plugging of the pressure-actuated vent can occur, fusible vents or vents of the type that soften to failure at a maximum of 300 degrees F. under fire exposure, may be used for the entire emergency venting requirement.

(3) [4-2.3] CONTAINER SIZE. Containers and portable tanks for liquids shall conform to Table 8.315-1 except as provided in par. (a) or (b). Approved plastic containers shall have the approving laboratory insignia embossed on the container.

Table 8.315-1
Maximum Allowable Size of Containers and Portable Tanks

Container Type	Flammable Liquids			Combustible Liquids	
	Class IA	Class IB	Class IC	Class II	Class III
Glass	1 pt.	1 qt.	1 gal.	1 gal.	5 gal.
Metal (other than DOT drums) or Approved Plastic	1 gal.	5 gal.	5 gal.	5 gal.	5 gal.
Safety Cans	2 gal.	5 gal.	5 gal.	5 gal.	5 gal.
Metal Drum (DOT Spec.)	60 gal.	60 gal.	60 gal.	60 gal.	60 gal.
Approved Portable Tanks	660 gal.	660 gal.	660 gal.	660 gal.	660 gal.
Polyethylene (DOT Spec. 34 or as Authorized by DOT Exemption)	1 gal.	5 gal.	5 gal.	60 gal.	60 gal.

(a) [4-2.3.1] Medicines, beverages, foodstuffs, cosmetics and other common consumer products, when packaged according to commonly accepted practices or retail sales, shall be exempted from the requirements of subs. (1) and (3).

(b) [4-2.3.2] Class IA and Class IB liquids may be stored in glass containers of not more than one gallon capacity if the required liquid purity (such as American Chemical Society (ACS) analytical reagent grade or higher) would be affected by storage in metal containers or if the liquid would cause excessive corrosion of the metal container.

Ind 8.32 [4-3] DESIGN, CONSTRUCTION AND CAPACITY OF STORAGE CABINETS.

(1) [4-3.1] CAPACITY. Not more than 120 gallons of Class I, Class II and Class IIIA liquids may be stored in a storage cabinet. Of this total, not more than 60 gallons may be of Class I and Class II liquids and not more than 3 such cabinets may be located in a single fire area, except that in an industrial occupancy, additional cabinets may be located in the same fire area if the additional cabinet, or group of not more than 3 cabinets is separated from other cabinets or group of cabinets by at least 100 feet.

(2) [4-3.2] DESIGN. Storage cabinets shall be designed and constructed to limit the internal temperature at the center, one inch from the top to not more than 325 degrees F. when subjected to a 10-minute fire test with burners simulating a room fire exposure using the standard time-temperature curve. All joints and seams shall remain tight and the door shall remain securely closed during the fire test. Cabinets shall be labeled in conspicuous lettering, "FLAMMABLE - KEEP FIRE AWAY."

(a) [4-3.2.1] Metal cabinets constructed in the following manner are acceptable. The bottom, top, door and sides of cabinet shall be at least No. 18 gage sheet steel and double walled with 1-1/2 inch air space. Joints shall be riveted, welded or made tight by some equally effective means. The door shall be provided with a 3-point latch arrangement and the door sill shall be raised at least 2 inches above the bottom of the cabinet to retain spilled liquid within the cabinet.

(b) [4-3.2.2] Wooden cabinets constructed in the following manner are acceptable. The bottom, sides and top shall be constructed of exterior grade plywood at least 1 inch in thickness, which shall not break down or delaminate under fire conditions. All joints shall be rabbetted and shall be fastened in 2 directions with wood screws. When more than one door is used, there shall be a rabbetted overlap of not less than one inch. Doors shall be equipped with a means of latching and hinges shall be constructed and mounted in such a manner as to not lose their holding capacity when subjected to fire exposure. A raised sill or pan capable of containing a 2-inch depth of liquid shall be provided at the bottom of the cabinet to retain spilled liquid within the cabinet.

(c) [4-3.2.3] Listed cabinets which have been constructed and tested in accordance with sub. (2) shall be acceptable.

Ind 8.325 [4-4] DESIGN, CONSTRUCTION AND OPERATION OF SEPARATE INSIDE STORAGE AREAS. (1) INSIDE ROOMS. (a) [4-4.1.1] Inside rooms shall be constructed to meet the selected fire resistance rating as specified in par. (d). Such construction shall comply with the test specifications approved by the department. Except for drains, floors shall be liquidtight and the room shall be liquidtight where the walls join the floor. Where an automatic fire protection system is provided, as indicated in par. (d), the system shall be designed and installed in accordance with the appropriate standard for the type of system selected.

(b) [4-4.1.2] Openings in interior walls to adjacent rooms or buildings shall be provided with:

1. Normally closed, listed 1-1/2 hour fire doors for interior walls with fire resistance rating of 2 hours or less. Where interior walls are required to have greater than 2 hours fire resistance rating, the listed fire doors shall be compatible with the wall rating. Doors may be arranged to stay open during material handling operations if doors are designed to close automatically in a fire emergency by provision of listed closing devices.

2. Noncombustible liquidtight raised sills or ramps at least 4 inches in height or otherwise designed to prevent the flow of liquids to the adjoining areas. A permissible alternative to the sill or ramp is an open-grated trench so located as to provide complete drainage and connected to an underground tank by means of a horizontal clapper type check valve located outside of the building.

(c) [4-4.1.3] Wood at least one inch nominal thickness may be used for shelving, racks, dunnage, scuffboards, floor overlay and similar installations.

(d) [4-4.1.4] Storage in inside rooms shall comply with the following:

Automatic Fire Protection* Provided	Fire Resistance	Maximum Floor Area	Total Allowable Quantities - Gallons/ Sq. Ft. of Floor Area
YES	2 hour	500 sq. ft.	10
NO	2 hour	500 sq. ft.	4**
YES	1 hour	150 sq. ft.	5
NO	1 hour	150 sq. ft.	2

* Fire protection system shall be sprinkler, water spray, carbon dioxide, dry chemical, halon or other approved system.

**Total allowable quantities of Class 1A and 1B liquids shall not exceed that permitted in table and the provisions of sub. (2) (i).

(e) [4-4.1.5] Electrical wiring and equipment located in inside rooms used for Class I liquids shall be suitable for Class I, Division 2 classified locations; for Class II and Class III liquids, shall be suitable for general use.

(f) [4-4.1.6] Every inside room shall be provided with either a gravity or a continuous mechanical exhaust ventilation system. Mechanical ventilation shall be used if Class I liquids are dispensed within the room.

1. Exhaust air shall be taken from a point near a wall on one side of the room and within 12 inches of the floor with one or more make-up inlets located on the opposite side of the room within 12 inches from the floor. The location of both the exhaust and inlet air openings shall be arranged to provide, as far as practicable, air movements across all portions of the floor to prevent accumulation of flammable vapors. Exhaust from the room shall be directly to the exterior of the building. If ducts are used, they shall not be used for any other purpose. If make-up air to a mechanical system is taken from within the building, the opening shall be equipped with a fire door or damper. For gravity systems, the make-up air shall be supplied from outside the building.

2. Mechanical ventilation systems shall provide at least one cubic foot per minute of exhaust per square foot of floor area, but not less than 150 CFM. The mechanical ventilation system for dispensing areas shall be equipped with an airflow switch or other equally reliable means, which is interlocked to sound an audible alarm upon failure of the ventilation system.

(g) [4-4.1.7] In every inside room, an aisle at least 3 feet wide shall be maintained so that no container is more than 12 feet from the aisle. Containers over 30 gallons capacity storing Class I or Class II liquids shall not be stored more than one container high.

(h) [4-4.1.8] Where dispensing is being done in inside rooms, operations shall comply with the provisions of subch. 7.

(i) [4-4.1.9] Class I liquids shall not be permitted in inside storage rooms in basement areas.

(2) [4-4.2] CUTOFF ROOMS AND ATTACHED BUILDINGS. (a) [4-4.2.1]

Construction design of exterior walls shall provide ready accessibility for fire fighting operations through provision of access openings, windows or lightweight noncombustible wall panels. Where Class IA or IB liquids are dispensed, or where Class IA liquids are stored in containers larger than one gallon, the exterior wall or roof construction shall be designed to include explosion venting features, such as lightweight wall assemblies, lightweight roof assemblies, roof hatches or windows of the explosion venting type. The design and construction of explosion venting shall be according to standards approved by the department.

(b) [4-4.2.2] Where other portions of buildings or other properties are exposed, each opening in the exposing wall shall be protected with a listed 1-1/2 hour (D) fire door and the walls shall have a fire resistance rating of not less than 2 hours.

(c) [4-4.2.3] Except as noted in par. (f) interior walls, ceiling and floors shall have a fire resistance rating of not less than 2 hours where floor area of the room or building exceeds 300 sq. ft. or a fire resistance rating of not less than one hour for a floor area of 300 sq. ft. or less. Walls shall be liquidtight at the floor level.

(d) [4-4.2.4] Openings in interior walls to adjacent rooms or buildings shall be in accordance with sub. (1) (b).

(e) [4-4.2.5] Curbs, scuppers, special drains or other suitable means shall be provided to prevent the flow of liquids under emergency conditions into adjacent building areas except where the individual container capacity is 5 gallons or less or if the liquids stored are only Class III liquids. The drainage system, if used, shall have sufficient capacity to carry off expected discharge of water from fire protection systems and hose streams.

(f) [4-4.2.6] Roofs of attached buildings, one story in height, may be lightweight noncombustible construction if the separating interior wall as specified in par. (c) has a minimum 3-foot parapet.

(g) [4-4.2.7] Unprotected storage in cutoff rooms and attached buildings shall comply with Table 8.325-1.

(h) [4-4.2.8] Protected storage in cutoff rooms and attached buildings shall comply with s. Ind 8.335 as applicable.

Table 8.325-1
Indoor Unprotected Storage of Liquids in Containers and Portable Tanks

Class	Container Storage			Portable Tank Storage		
	Max Pile Height(ft)	Max Quant. per Pile(gal)	Max Total Quant.(gal)	Max Pile Height(ft)	Max Quant. per Pile(gal)	Max. Total Quant.(gal)
1A	5	660	660	-	Not permitted	-
1B	5	1,375	1,375	7	2,000	2,000
1C	5	2,750	2,750	7	4,000	4,000
II	10	4,125	8,250	7	5,500	11,000
IIIA	15	13,750	27,500	7	22,000	44,000
IIIB	15	13,750	55,000	7	22,000	88,000

(i) [4-4.2.9] Wood of at least one inch nominal thickness may be used for shelving, dunnage, floor overlay and similar installments.

(j) [4-4.2.10] Where 2 or more classes of liquids are stored in a single pile or rack section, the maximum quantities and height of storage permitted in that pile or rack section shall be the smallest of the 2 or more separate quantities and heights. The maximum total quantities permitted shall be limited to a sum of proportional amounts that each class of liquid present bears to the maximum total permitted for its respective class; sum of proportional amounts not to exceed 100 percent.

(k) [4-4.2.11] Dispensing operations of Class I or Class II liquids are not permitted in cutoff rooms or attached buildings exceeding 1000 sq. ft. floor area. In rooms where dispensing of Class I liquids is permitted, electrical systems and ventilation shall be provided in ss. Ind. 8.325 (1) (e) and (f) and operations shall comply with the provisions of subch. 7.

(l) [4-4.2.12] Basement Storage Areas. Class I liquids shall not be permitted in the basement areas of cutoff rooms and attached buildings. Class II and Class IIIA liquids shall be permitted to be stored in basements provided that automatic sprinkler protection and other fire protection facilities are provided in accordance with sub. (1) (f).

Ind 8.33 [4-5] INDOOR STORAGE. (1) [4-5.1] BASIC CONDITIONS. (a) [4-5.1.1] The storage of any liquids shall not physically obstruct a means of egress. Class I liquids in other than separate inside storage areas or warehouses shall be so placed that a fire in the liquid storage would not preclude egress from the area.

(b) [4-5.1.2] The storage of liquids in containers or portable tanks shall comply with subs. (2) through (7) as applicable. Where separate inside storage areas are required, they shall conform to s. Ind 8.325. Where other factors substantially increase or decrease the hazard, the authority having jurisdiction may modify the quantities specified.

(c) [4-5.1.3] Liquids used for building maintenance painting or other similar infrequent maintenance purposes may be stored temporarily in closed containers outside of storage cabinets or separate inside storage areas, if limited in amount, not to exceed a 10-day supply at anticipated rates of consumption.

(2) [4-5.2] DWELLING AND RESIDENTIAL BUILDINGS CONTAINING NOT MORE THAN 2 DWELLING UNITS AND ACCOMPANYING ATTACHED AND DETACHED GARAGES. Storage in excess of 25 gallons of Class I and Class II liquids combined shall be prohibited. In addition, storage in excess of 60 gallons of Class IIIA liquid shall be prohibited. The specified limitations do not apply to tanks supplying fuel directly to engines. Auxiliary boat tanks are not tanks supplying fuel directly to engines.

(3) [4-5.3] ASSEMBLY OCCUPANCIES, BUILDINGS CONTAINING MORE THAN 2 DWELLING UNITS, AND HOTELS. Storage in excess of 10 gallons of Class II and Class IIIA liquids combined shall be in containers stored in storage cabinets, in safety cans or in a separate inside storage area not having an opening communicating with that portion of the building used by the public. Portable containers pursuant to s. Ind 8.345 (1) containing gasoline and Class I liquids shall be prohibited except as follows:

(a) Storage shall be limited to a total of 10 gallons;

(b) The room in which the containers are stored shall not exceed 150 square feet in floor area;

(c) The room is completely separated from the remainder of the building by walls, floors and ceilings of at least one hour fire resistive rating;

(d) The floor and base shall be liquid-tight;

(e) All openings into the room shall be from the outside. No openings into that portion of the building used by the public shall be permitted;

(f) Light fixtures in the room shall be controlled by a switch located outside the room;

(g) A pilot light shall be located adjacent to the switch specified in par. (f) if class I flammable liquids are dispensed in the room; and

(h) The room shall be provided with either a gravity or mechanical exhaust ventilation system capable of providing 10 air changes per hour within the room.

1. Mechanical exhaust ventilation systems shall be controlled by a switch located outside the room.

2. Gravity exhaust ventilation systems shall comply with the following:

a. The outside air shall be taken from and the exhaust air shall be discharged directly to the exterior of the building.

b. The exhaust air shall be taken from a level not more than 18 inches above the floor of the room.

c. The vents shall extend at least 2 feet above the high point of the roof or roof structure and shall be equipped with an approved siphon-type roof ventilator.

(4) [4-5.4] OFFICE, EDUCATIONAL AND INSTITUTIONAL OCCUPANCIES. Storage shall be limited to that required for operation of office equipment, maintenance, demonstration and laboratory work. This storage shall comply with the provisions of this subsection except that the storage for industrial and educational laboratory work shall comply with the Standard on Fire Protection for Laboratories Using Chemicals, NFPA 45.

(a) [4-5.4.1] Containers for Class I liquids outside of a separate inside storage area shall not exceed a capacity of one gallon, except that safety cans can be of 2 gallons capacity.

(b) [4-5.4.2] Not more than 10 gallons of Class I and Class II liquids combined shall be stored in a single fire area outside of a storage cabinet or a separate inside storage area unless in safety cans.

(c) [4-5.4.3] Not more than 25 gallons of Class I and Class II liquids combined shall be stored in a single fire area in safety cans outside of a separate inside storage area or storage cabinet.

(d) [4-5.4.4] Not more than 60 gallons of Class IIIA liquids shall be stored outside of a separate inside storage area or storage cabinet.

(5) [4-5.5] MERCANTILE OCCUPANCIES AND RETAIL STORES; AND OTHER RELATED AREAS ACCESSIBLE TO THE PUBLIC. (a) [4-5.5.1] In rooms or areas accessible to the public, storage of Class I, Class II and Class IIIA liquids shall be limited to quantities needed for display and normal merchandising purposes but shall not exceed 2 gallons per square foot of gross floor area. Storage of Class IA liquids shall be prohibited in basement display areas and limited to one gallon per square foot on other floors. In areas not protected, storage of Class IB, IC and II liquids on other than the ground floor shall be limited to one gallon per square foot of gross floor area. Protected shall mean protected with automatic sprinklers installed at least in accordance with the Standard for the Installation of Automatic Sprinklers, NFPA 13-1980, requirements for ordinary hazard Group 2 occupancies. The gross floor area used for computing the maximum quantity permitted shall be considered as that portion of the floor actually being used for merchandising liquids and immediately adjacent aisles.

(b) [4-5.5.2] The aggregate quantity of additional stock in areas not accessible to the public shall not exceed the greater of that which would be permitted if the area were accessible to the public or 60 gallons of Class IA, 120 gallons of Class IB, 180 gallons of Class IC, 240 gallons of Class II, or 660 gallons of Class IIIA liquids, or 240 gallons in any combination of Class I and Class II liquids subject to the limitations of the individual class. These quantities may be doubled for areas protected pursuant to par. (a). Storage of Class IA liquids shall be prohibited in basement storage areas.

(c) [4-5.5.3] Quantities in excess of those permitted in par. (b) shall be stored in accordance with other appropriate sections of this chapter.

(d) [4-5.5.4] Containers shall not be stacked more than 3 feet or 2 containers high, whichever is the greater, unless on fixed shelving or otherwise satisfactorily secured.

(e) [4-5.5.5] Shelving shall be of stable construction, of sufficient depth and arrangement such that containers displayed thereon shall not easily be displaced.

(f) [4-5.5.6] Leaking containers shall be removed immediately to an adequately ventilated area, and the contents transferred to an undamaged container.

(6) [4-5.6] GENERAL PURPOSE WAREHOUSES. (a) [4-5.6.1] General purpose warehouses shall be separate, detached buildings or shall be separated from other type occupancies by a 4 hour fire division wall. Each opening in the fire division wall shall be protected with approved 3 hour fire door assembly with a fusible link or other automatic actuating mechanism located in the opening or on both sides of the opening.

(b) [4-5.6.2] Warehousing operations that involve storage of liquids shall be restricted to separate inside storage areas or to liquid warehouses in accordance with s. Ind 8.325 or s. Ind 8.33 (7), except as provided in par. (c).

(c) [4-5.6.3] 1. Class IB and IC liquids in containers of one gallon or less capacity, Class II liquids in containers of 5 gallons or less capacity, Class III liquids in containers of 60 gallons or less capacity may be stored in warehouses handling combustible commodities, provided that the storage area is protected with automatic sprinklers in accordance with the provisions of this chapter for 20 foot storage of Class IV commodities and the quantities and height of liquid storage are limited to:

Class of Liquid	Total Amount Allowed (gal)	Maximum Height of Piles (ft)
1. Class IB and IC	660	5
2. Class II	1,375	5
3. Class IIIA	2,750	10
4. Class IIIB	13,750	15

2. The liquid storage shall also conform to pars. (d) through (g).

(d) [4-5.6.4] Basement Storage Areas. Class I liquids shall not be permitted in the basement areas of buildings. Class II and Class IIIA liquids may be stored in basements provided that automatic sprinkler protection and other fire protection facilities are provided in accordance with s. Ind 8.335.

(e) [4-5.6.5] Palletized, Solid Pile or Rack Storage. Liquids in containers may be stored on pallets, in solid piles or on racks subject to the quantities and heights limits of par. (c) provided the protection is in accordance with s. Ind 8.335 as applicable.

(f) [4-5.6.6] Separation and Aisles. Palletized or solid pile storage shall be arranged so that piles permitted in par. (c) are separated from each other by at least 4 foot aisles. Aisles shall be provided so that no container is more than 12 feet from an aisle. Where the storage of liquids is on racks, a minimum 4 foot wide aisle shall be provided between adjacent rows of racks and adjacent storage of liquids. Main aisles shall be a minimum of 8 feet wide. Where ordinary combustible commodities are stored in the same area as liquids in containers, the minimum distance between the 2 types of storage shall be 8 feet.

(g) [4-5.6.7] Mixed Storage. Liquids shall not be stored in the same pile or in the same rack sections as ordinary combustible commodities. Where liquids are packaged together with ordinary combustibles, as in kits, the storage shall be considered on the basis of whichever commodity predominates. When 2 or more classes of liquids are stored in a single pile or single rack section, the maximum quantities permitted in the pile or rack section shall be the smallest of the 2 or more separate maximum quantities, and the height of storage permitted in that pile or rack section shall be the least of the 2 or more separate heights. The maximum total quantities permitted shall be limited to the sum of proportional amounts that each class of liquid present bears to the maximum total permitted for its respective class. The sum of proportional amounts shall not exceed 100 percent.

(7) [4-5.7] LIQUID WAREHOUSES. (a) [4-5.7.1] Liquid warehouses shall be separate, detached buildings or shall be separated from other type occupancies by standard 4 hour fire walls, with communicating openings protected on each side of the wall with automatic closing listed 3 hour fire doors.

(b) [4-5.7.2] If the warehouse building is located more than 10 feet but less than 50 feet from an important building or line of adjoining property than can be built upon, the exposing wall shall have a fire resistance rating of at least 2 hours with each opening protected with a listed 1-1/2 hour fire door.

(c) [4-5.7.3] If the warehouse is located 10 feet or less from an important building or line of adjoining property that can be built upon, the exposing wall shall have a fire resistance rating of 4 hours with each opening protected with a listed 3 hour fire door.

(d) [4-5.7.4] An attached warehouse, having communicating openings in the required 4 hour fire wall separation from the adjacent building area shall have these openings protected by:

1. Normally closed listed 3 hour fire doors on each side of the wall. These doors may be arranged to stay open during material handling operations, only if the doors are designed to close automatically in a fire emergency by provision of listed closing devices; and

2. Noncombustible liquidtight, raised sills or ramps, at least 4 inches in height, or other design features to prevent flow of liquids to the adjoining area.

(e) [4-5.7.5] Fire doors shall be installed pursuant to s. Ind 51.047, Wis. Adm. Code.

(f) [4-5.7.6] The total quantity of liquids within a liquid warehouse shall not be restricted. The maximum pile heights and maximum quantity per pile, arranged as palletized or solid pile storage or shall comply with Table 8.325-1, if unprotected, or Table 8.335-1 if protected in accordance with s. Ind 8.335. The storage heights of containers on protected racks shall comply with Table 8.335-2 as applicable.

1. 'Exception'. An unprotected liquid warehouse located a minimum of 100 feet from exposed buildings or adjoining property that can be built upon is not required to conform to Table 8.335-1 if there is protection for exposures. Where protection for exposures is not provided, a minimum 200 feet distance is required.

(g) [4-5.7.7] Class I liquids shall not be permitted in the basement areas of liquid warehouses. Class II and Class IIIA liquids may be stored in basements provided that automatic sprinkler protection and other fire protection facilities are provided in accordance with s. Ind 8.335.

(h) [4-5.7.8] Limited amounts of combustible commodities, as approved by the department or authorized deputy may be stored in liquid warehouses if protection is provided in accordance with s. Ind 8.335 and the ordinary combustibles, other than those used for packaging the liquids, are separated a minimum of 8 feet horizontally, by aisles or open racks, from the liquids in storage.

(i) [4-5.7.9] Empty or idle combustible pallet storage shall be limited to a maximum pile size of 2500 square feet and to a maximum storage height of 6 feet. Idle pallet storage shall be separated from liquids by at least 8-foot wide aiseways.

(j) [4-5.7.10] Containers in piles shall be separated by pallets or dunnage to provide stability and to prevent excessive stress on container walls. Portable tanks stored over one tier high shall be designed to nest securely, without dunnage. Materials handling equipment shall be suitable to handle containers and tanks safely at the upper tier level.

(k) [4-5.7.11] No container or portable tank shall be stored closer than 36 inches to the nearest beam, chord, girder or other roof member in an unprotected warehouse.

(1) [4-5.7.12] Solid pile and palletized storage shall be arranged so that piles are separated from each other by at least 4 feet. Aisles shall be provided so that no container or tank is more than 12 feet from an aisle. Where storage on racks exists as permitted in this chapter, a minimum 4 foot wide aisle shall be provided between adjacent rows of racks and any adjacent storage of liquids. Main aisles shall be a minimum of 8 feet wide, and access shall be maintained to all doors required for egress.

(m) [4-5.7.13] Mixed Storage. When 2 or more classes of liquids are stored in a single pile, the maximum quantity permitted in that pile shall be the smallest of the 2 or more separate maximum quantities and the heights of storage permitted in that pile shall be the least of the 2 or more separate heights as given in Tables 8.325-1 or 8.335-1 as applicable. When 2 or more classes of liquids are stored in the same racks as permitted in this chapter, the maximum height of storage permitted shall be the least of the 2 or more separate heights given in Table 8.335-2.

Ind 8.335 [4-6] PROTECTION REQUIREMENTS FOR PROTECTED STORAGE OF LIQUIDS.

(1) [4-6.1] STORAGE ARRANGEMENTS. Containers and portable tanks storing flammable and combustible liquids may be stored in the quantities and arrangements specified in Tables 8.335-1 and 8.335-2 provided the storage is protected in accordance with subs. (2) and (5) as applicable.

(a) [4-6.1.1] Other quantities and arrangements may be used where suitably protected and approved by the authority having jurisdiction.

(2) [4-6.2] AUTOMATIC SPRINKLER PROTECTION. Where automatic sprinklers are used, they shall be installed pursuant to NFPA 13-1980 - Standard for the Installation of Sprinkler Systems, and shall be approved by the department.

(a) [4-6.2.1] Other systems such as automatic foam-water systems, automatic water-spray systems, or other combinations or systems may be considered acceptable if approved by the authority having jurisdiction.

(3) [4-6.3] RACKS. Racks storing Class I or Class II liquids shall be either single-row or double-row.

(4) [4-6.4] COMBUSTIBLE. Ordinary combustibles other than those used for packaging the liquids shall not be stored in the same rack section as liquids, and shall be separated a minimum of 8 feet horizontally, by aisles or open racks, from liquids stored in racks.

(5) [4-6.5] IN-RACK SPRINKLERS. In-rack sprinklers shall be installed as approved by the department or its authority, except as modified by sub. (2). Alternate lines of in-rack sprinklers shall be staggered. Multiple levels of in-rack sprinkler heads shall be provided with water shields unless otherwise separated by horizontal barriers, or unless the sprinkler heads are listed for such installations.

Table 8.335-1
 Storage Arrangements for Protected Palletized or Solid Pile Storage of Liquids
 in Containers and Portable Tanks

Class	Storage Level	Max Stge Height-ft		Max Qnty per Pile-gal		Max Qnty-gal	
		Containers/Port.Tanks	Containers/Port.Tanks	Containers/Port.Tanks	Containers/Port.Tanks	Containers/Port.Tanks	Containers/Port.Tanks
IA	Ground Fl.	5	-	3,000	-	12,000	-
	Upper Fls.	5	-	2,000	-	8,000	-
	Basements	-Not Permitted-		-	-	-	-
IB	Ground Fl.	6-1/2	7	5,000	20,000	15,000	40,000
	Upper Fls.	6-1/2	7	3,000	10,000	12,000	20,000
	Basements	-Not Permitted-		-	-	-	-
IC	Ground Fl.	*6-1/2	7	5,000	20,000	15,000	40,000
	Upper Fls.	*6-1/2	7	3,000	10,000	12,000	20,000
	Basements	-Not Permitted-		-	-	-	-
II	Ground Fl.	10	14	10,000	40,000	25,000	80,000
	Upper Fls.	10	14	10,000	40,000	25,000	80,000
	Basements	5	7	7,500	20,000	7,500	20,000
III	Ground Fl.	20	14	15,000	60,000	50,000	100,000
	Upper Fls.	20	14	15,000	60,000	50,000	100,000
	Basements	10	7	10,000	20,000	25,000	40,000

*These height limitations may be increased to 10 feet for containers of 5 gallons or less in capacity.

Table 8.335-2
Storage Arrangements for Protected Rack Storage of
Liquids in Containers

Class	Type Rack	Storage Level	Max. Stge. Height(ft.)	Max. Quantity(gal.)
			Containers	Containers
IA	Double Row or Single Row	Ground Fl.	25'	7,500
		Upper Fl.	15'	4,500
		Basements	Not Permitted	-
IB	Double Row or Single Row	Ground Fl.	25'	15,000
		Upper Fl.	15'	9,000
		Basements	Not Permitted	-
II	Double Row or Single Row	Ground Fl.	25'	24,000
		Upper Fl.	25'	24,000
		Basements	15'	9,000
III	Multi-Row Double Row or Single Row	Ground Fl.	40'	48,000
		Upper Fl.	20'	48,000
		Basements	20'	24,000

Ind 8.34 [4-7] FIRE CONTROL. (1) [4-7.1] FIRE SUPPRESSION EQUIPMENT AND SYSTEMS. Suitable fire extinguishers or preconnected hose lines, either 1-1/2 inch lined or one inch hard rubber, shall be provided where liquids are stored. Where 1-1/2 inch fire hose is used, it shall comply with the applicable provisions of s. Ind 51.21, Wis. Adm. Code.

(a) [4-7.1.1] At least one portable fire extinguisher having a rating of not less than 20-B shall be located outside of, but not more than 10 feet from, the door opening into any separate inside storage area.

(b) [4-7.1.2] At least one portable fire extinguisher having a rating of not less than 20-B shall be located not less than 10 feet, nor more than 50 feet, from any Class I or Class II liquid storage area located outside of a separate inside storage area.

(c) [4-7.1.3] In protected general purpose and liquid warehouses, hand hose lines shall be provided in sufficient number to reach all liquid storage areas.

(d) [4-7.1.4] The water supply shall be sufficient to meet the fixed fire protection demand, plus a total of at least 500 gallons per minute for inside and outside hose lines.

(2) [4-7.2] CONTROL OF IGNITION SOURCES. Precautions shall be taken to prevent the ignition of flammable vapors. Sources of ignition include but are not limited to open flames; lightning; smoking; cutting and welding; hot surfaces; frictional heat; static electrical and mechanical sparks; spontaneous ignition, including heat-producing chemical reactions; and radiant heat.

(3) [4-7.3] DISPENSING AREA SEPARATION. Dispensing of Class I and Class II liquids in general purpose or liquid warehouses shall not be permitted unless the dispensing area is suitably cut off from other ordinary combustible or liquid storage areas, as specified in s. Ind 8.325 and otherwise conforms with the applicable provisions of s. Ind 8.325.

(4) [4-7.4] WATER REACTIVE MATERIALS. Materials with a water reactivity degree of 2 or higher shall not be stored in the same area with other liquids.

Ind 8.345 [4-8] OUTDOOR STORAGE. (1) [4-8.1] STORAGE ARRANGEMENTS. Outdoor storage of liquids in containers and portable tanks shall be in accordance with Table 8.345-1 as qualified by this subsection and subs. (2) to (4).

(a) [4-8.1.1] When 2 or more classes of materials are stored in a single pile, the maximum gallonage in that pile shall be the smallest of the 2 or more separate gallonages.

(b) [4-8.1.2] No container or portable tank in a pile shall be more than 200 feet from a 12-foot wide access way to permit approach of fire control apparatus under all weather conditions.

(c) [4-8.1.3] The distances listed in Table 8.345-1 apply to properties that have protection for exposures as defined. If there are exposures, and such protection for exposures does not exist, the distances in column 4 shall be doubled.

(d) [4-8.1.4] When total quantity stored does not exceed 50 percent of maximum per pile, the distances in columns 4 and 5 may be reduced 50 percent, but to not less than 3 feet.

(2) [4-8.2] FIRE RESISTIVE CONSTRUCTION AND SEPARATIONS. A maximum of 1,100 gallons of liquids in closed containers and portable tanks may be stored adjacent to a building located on the same premises and under the same management provided that the building is limited to a one story building of fire resistive or noncombustible construction and is devoted principally to the storage and handling of liquids, or the building has an exterior wall with a fire resistance rating of not less than 2 hours and having no opening to above grade areas within 10 feet horizontally of such storage and no openings to below grade areas within 50 feet horizontally of such storage.

(a) [4-8.2.1] The quantity of liquids stored adjacent to a building protected in accordance with sub. (2) may exceed that permitted in that subsection provided the maximum quantity per pile does not exceed 1,100 gallons and each pile is separated by a 10-foot minimum clear space along the common wall.

(b) [4-8.2.2] Where the quantity stored exceeds the 1,100 gallons permitted adjacent to the building given in sub. (2) (a) cannot be met, a minimum distance in accordance with column 4 of Table 8.345-1 shall be maintained between buildings and nearest container or portable tank.

(3) [4-8.3] SPILLAGE CONTAINMENT. The storage area shall be graded in a manner to divert possible spills away from buildings or other exposures or shall be surrounded by a curb at least 6 inches high. When curbs are used, provisions shall be made for draining of accumulations of ground or rain water or spills of liquids. Drains shall terminate at a safe location and shall be accessible to operation under fire conditions.

(4) [4-8.4] MAINTENANCE OF AREA. Storage area shall be protected against tampering or trespassers where necessary and shall be kept free of weeds, debris and other combustible materials not necessary to the storage.

Table 8.345-1
Outdoor Liquid Storage in Containers and Portable Tanks

Class	Container Storage-Max. per Pile		Portable Tank Storage Max. per Pile Gallons ¹		Distance Between Piles or Racks(ft)	Distance to Property Line That Can be Built Upon(ft) ^{2,3}	Distance to Street, Alley, or a Public Way (ft) ³
	Gallons ^{1,4}	Height (ft)	Gallons ^{1,4}	Height (ft)			
IA	1,100	10	2,200	7	5	50	10
IB	2,200	12	4,400	14	5	50	10
IC	4,400	12	8,800	14	5	50	10
II	8,800	12	17,600	14	5	25	5
III	22,000	18	44,000	14	5	10	5

¹ See sub. (1) (a) regarding mixed class storage.

² See sub. (1) (c) regarding protection for exposures.

³ See sub. (1) (d) for smaller pile sizes.

⁴ For storage in racks, the quantity limits per pile do not apply, but the rack arrangement shall be limited to a maximum of 50 feet in length and 2 rows or 9 feet in depth.

SUBCHAPTER 7
COMMERCIAL AND INDUSTRIAL PLANTS

Ind 8.35 [5-1] SCOPE. (1) [5-1.1] APPLICATION. This subchapter shall apply to those commercial and industrial plants where the use of liquids is incidental to the principal business; where liquids are handled or used only in unit physical operations such as mixing, drying, evaporating, filtering, distillation and similar operations which do not involve chemical reaction. This subchapter shall not apply to chemical plants, refineries or distilleries, as defined, which are covered in subch. 11.

(2) [5-1.2] SPECIAL PROCESSES. Where portions of such plants involve chemical reactions such as oxidation, reduction, halogenation, hydrogenation, alkylation, polymerization and other chemical processes, those portions of the plant shall be in accordance with subch. 10.

Ind 8.355 [5-2] INCIDENTAL STORAGE OR USE OF LIQUIDS. (1) [5-2.1] SCOPE. This section shall be applicable to those portions of a commercial or an industrial plant where the use and handling of liquids is only incidental to the principal business, such as automobile assembly, construction of electronic equipment, furniture manufacturing or other similar activities.

(2) [5-2.2] TANKS AND CLOSED CONTAINERS. Liquids shall be stored in tanks or closed containers.

(a) [5-2.2.1] Except as provided in pars. (b) and (c) all storage shall comply with subch. 6.

(b) [5-2.2.2] The quantity of liquid that may be located outside of an inside storage room or storage cabinet or in any one fire area of a building, shall not exceed the greater of that given in 1 through 4:

1. A supply for one day, or
2. 25 gallons of Class IA liquids in containers, and
3. 120 gallons of Class IB, IC, II or III liquids in containers, and
4. One portable tank not exceeding 660 gallons of Class IB, IC, Class II or Class III liquids.

(c) [5-2.2.3] Where large quantities of liquids are necessary, storage may be in tanks, which shall comply with the applicable requirements of subch. 4 and ss. Ind 8.36 through 8.385.

(3) [5-2.3] SEPARATIONS. Areas in which liquids are transferred from one tank or container to another container shall be separated from other operations in the building by construction having a minimum one-hour fire resistance rating. Drainage or other means shall be provided to control spills. Adequate natural or mechanical ventilation shall be provided.

(4) [5-2.4] HANDLING LIQUIDS AT POINT OF FINAL USE. (a) [5-2.4.1] Class I and Class II liquids shall be kept in covered containers when not actually in use.

(b) [5-2.4.2] Where liquids are used or handled, except in closed containers, means shall be provided to dispose promptly and safely of leakage or spills.

(c) [5-2.4.3] Class I liquids may be used only where there are no open flames or other sources of ignition within the possible path of vapor travel.

(d) [5-2.4.4] Class I and Class II liquids shall be drawn from or transferred into vessels, containers or portable tanks within a building only from original shipping containers with a capacity of 5 gallons or less, or from safety cans, or through a closed piping system, or from a portable tank or container by means of a device drawing through an opening in the top of the tank or container.

(e) [5-2.4.5] Transferring liquids by means of pressurizing the container with air is prohibited. Transferring liquids by pressure of inert gas is permitted only if controls, including pressure relief devices, are provided to limit the pressure so it cannot exceed the design pressure of the vessel, tank or container.

Ind 8.36 [5-3] UNIT PHYSICAL OPERATIONS. (1) [5-3.1] SCOPE. This section shall be applicable in those portions of commercial or industrial plants where liquids are handled or used in unit physical operations such as mixing, drying, evaporating, filtering, distillation and similar operations which do not involve chemical change.

Note: Examples are plants compounding cosmetics, pharmaceuticals, solvents, cleaning fluids, insecticides and similar types of activities.

(2) [5-3.2] BUILDING LOCATION. Industrial plants shall be located so that each building or unit of equipment is accessible from at least one side for fire fighting and fire control purposes. Buildings shall be located with respect to lines of adjoining property which may be built upon as set forth in s. Ind 8.555 (1) and (2), except that the blank wall referred to in s. Ind 8.555 (2) shall have a fire resistance rating of at least 2 hours.

(3) [5-3.3] SEPARATION. Areas where unstable liquids are handled or small scale unit chemical processes are carried on shall be separated from the remainder of the plant by a fire wall having a fire resistance rating of not less than 2 hours.

(4) [5-3.4] DRAINAGE. (a) [5-3.4.1] Emergency drainage systems shall be provided to direct flammable or combustible liquid leakage and fire protection water to a safe location. This may require curbs, scruppers or special drainage systems to control the spread of fire.

(b) [5-3.4.2] Emergency drainage systems, if connected to public sewers or discharged into public waterways, shall be equipped with traps or separators.

(c) [5-3.4.3] The commercial or industrial plant shall be designed and operated to prevent the normal discharge of flammable or combustible liquids into public waterways, public sewers or adjoining property.

(5) [5-3.5] VENTILATION. (a) [5-3.5.1] Areas as defined in sub. (1) using Class I liquids shall be ventilated at a rate of not less than one cubic foot per minute per square foot of solid floor area. This shall be accomplished by natural or mechanical ventilation with discharge or exhaust to a safe location outside of the building. Provision shall be made for introduction of make-up air in such a manner as not to short circuit the ventilation. Ventilation shall be arranged to include all floor areas or pits where flammable vapors can collect. Local or spot general ventilation may be needed for the control of special fire or health hazards. Such ventilation, if provided, may be utilized for up to 75 percent of the required ventilation.

(b) [5-3.5.2] Equipment used in a building and the ventilation of the building shall be designed so as to limit flammable vapor-air mixtures under normal operating conditions to the interior of equipment, and to not more than 5 feet from equipment which exposes Class I liquids to the air.

Note: Examples of such equipment are dispensing stations, open centrifuges, plate and frame filters, open vacuum filters and surfaces of open equipment.

(6) [5-3.6] STORAGE, TRANSFER AND HANDLING. The storage, transfer and handling of liquids shall comply with s. Ind 8.565 of subch. 10 and the piping involved with such storage, transfer and handling shall be color coded as specified in s. Ind 8.435.

Ind 8.365 [5-4] TANK VEHICLE AND TANK CAR LOADING AND UNLOADING. Tank vehicle and tank car loading or unloading facilities shall be separated from aboveground tanks, warehouses, other plant buildings or nearest line of adjoining property which can be built upon by a distance of 25 feet for Class I liquids and 15 feet for Class II and Class III liquids measured from the nearest position of any fill stem. Buildings for pumps or shelters for personnel can be a part of the facility. Operations of the facility shall comply with the appropriate portions of s. Ind 8.41.

Ind 8.37 [5-5] FIRE CONTROL. (1) [5-5.1] FIRE EXTINGUISHERS. Portable fire extinguishment and control equipment shall be provided in such quantities and types as are needed for the special hazards of operation and storage.

(2) [5-5.2] WATER SUPPRESSION SYSTEMS. Water shall be available in volume and at adequate pressure to supply water hose streams, foam-producing equipment, automatic sprinklers or water spray systems as the need is indicated by the special hazards of operation, dispensing and storage.

(3) [5-5.3] SPECIAL SUPPRESSION SYSTEMS. Special extinguishing equipment such as that utilizing foam, inert gas or dry chemical shall be provided as the need is indicated by the special hazards of operation, dispensing and storage.

(4) [5-5.4] SPECIAL HAZARDS. Where the need is indicated by special hazards of operation, liquid processing equipment, major piping, and supporting steel shall be protected by approved water spray systems, deluge systems, approved fire resistant coatings, insulation or any combination of these.

(5) [5-5.6] MAINTENANCE AND INSPECTION. All plant fire protection facilities shall be adequately maintained and periodically inspected and tested to make sure they are always in satisfactory operating condition, and they will serve their purpose in time of emergency.

Ind 8.375 [5-6] SOURCES OF IGNITION. (1) [5-6.1] PRECAUTIONS. Precautions shall be taken to prevent the ignition of flammable vapors. Sources of ignition include but are not limited to open flames; lightning; smoking; cutting and welding; hot surfaces; frictional heat; static, electrical and mechanical sparks; spontaneous ignition, including heat-producing chemical reactions; and radiant heat.

(2) [5-6.2] ELECTRICAL CONTACT. Class I, Class II or Class III liquids at a temperature above their flash points shall not be dispensed into metal containers unless the nozzle or fill pipe is in electrical contact with the container. This can be accomplished by maintaining metallic contact during filling, by a bond wire between them, or by other conductive path having an electrical resistance not greater than 10^6 ohms. Bonding is not required where a container is filled through a closed system, or the container is made of glass or other nonconducting material.

Ind 8.38 [5-7] ELECTRICAL EQUIPMENT. (1) [5-7.1] SCOPE. This section shall apply to areas where Class I liquids are stored or handled or where Class II or Class III liquids are stored or handled at a temperature above their flash points. For areas where Class II or Class III liquids only are stored or handled at a temperature below their flash points, the electrical equipment may be installed in accordance with the provisions of ch. ILHR 16, Wis. Adm. Code, for ordinary locations; however, care shall be used in locating electrical apparatus to prevent hot metal from falling into open equipment.

(2) [5-7.2] GENERAL. All electrical equipment and wiring shall be of a type specified by and shall be installed in accordance with ch. ILHR 16, Wis. Adm. Code.

(3) [5-7.3] CLASSIFICATION OF AREAS. So far as it applies, Table 8.38-1 shall be used to delineate and classify areas for the purpose of installation of electrical equipment under normal circumstances. In the application of classified areas, a classified area shall not extend beyond an unpierced floor, wall, roof or other solid partition. The designation of classes and divisions is defined in ch. ILHR 16, Wis. Adm. Code.

(4) [5-7.4] SPECIAL CONDITIONS. The area classifications listed in Table 8.38-1 are based on the premise that the installation meets the applicable requirements of this chapter in all respects. Should this not be the case, the authority having jurisdiction shall have the authority to determine the extent of the classified areas.

(5) [5-7.5] CLASSIFICATION ASSIGNMENT. Extent of classified areas shall be as shown in Table 8.38-1.

(6) [5-7.6] EXCEPTIONS FOR ENCLOSURE. Where the provisions of subs. (1) to (5) require the installation of electrical equipment suitable for Class I, Division 1 or Division 2 locations, ordinary electrical equipment including switchgear may be used if installed in a room or enclosure which is maintained under positive pressure with respect to the classified area. Ventilation makeup air shall not be contaminated by flammable vapors.

Table 8.38-1

Location	National Electrical Code Class I Division	Extent of Classified Area
DRUM AND CONTAINER FILLING		
Outdoors, or Indoors with Ade- quate Ventilation	1	Within 3 feet of vent and fill opening, extending in all directions.
	2	Area between 3 feet and 5 feet from vent or fill opening, extending in all directions. Also, up to 18 inches above floor or grade level within a horizontal radius of 10 feet from vent or fill opening.
PUMPS, BLEEDERS, WITHDRAWAL FITTINGS, METERS AND SIMILAR DEVICES		
Indoors	2	Within 5 feet of any edge of such devices, extending in all directions. Also up to 3 feet above floor or grade level within 25 feet horizontally from any edge of such devices.
Outdoors	2	Within 3 feet of any edge of such devices, extending in all directions. Also, up to 18 inches above grade level within 10 feet horizontally from any edge of such devices.
PITS		
Without Mechanical Ventilation	1	Entire area within pit if any part is within a Division 1 or 2 classified area.
With Mechanical Ventilation	2	Entire area within pit if any part is within a Division 1 or 2 classified area.

Table 8.38-1 (Continued)

Location	National Electrical Code Class I Division	Extent of Classified Area
PITS (continued)		
Containing Valves, Fittings or Piping, and Not Within a Division 1 or 2 Classified Area	2	Entire Pit.
DRAINAGE DITCHES, SEPARATORS, IMPOUNDING BASINS	2	Area up to 18 inches above ditch, separator or basin. Also, up to 18 inches above grade within 15 feet horizontally from any edge.
Indoors equipment installed in accordance with s. Ind 8.36 (5) (b) where flammable vapor-air mixtures may exist under normal operations	1	Area within 5 feet of any edge of such equipment, extending in all directions.
	2	Area between 5 feet and 8 feet of any edge of such equipment, extending in all directions. Also, area up to 3 feet above floor or grade level within 5 feet to 25 feet horizontally from any edge of such equipment.*
Outdoor equipment of the type covered in s. Ind 8.36 (5) (b) where flammable vapor-air mixtures may exist under normal operations.	1	Area within 3 feet of any edge of such equipment, extending in all directions.
	2	Area between 3 feet and 8 feet of any edge of such equipment extending in all directions. Also, area up to 3 feet above floor or grade level within 3 feet to 10 feet horizontally from any edge of such equipment.
TANK - ABOVEGROUND**		
Shell, Ends, or Roof and Dike Area	2	Within 10 feet from shell, ends or roof of tank. Area inside dikes to level of top of dike.
Vent	1	Within 5 feet of open end of vent, extending in all directions.

Table 8.38-1 (Continued)

Location	National Electrical Code Class I Division	Extent of Classified Area
TANK - ABOVEGROUND** (continued)	2	Area between 5 feet and 10 feet from open end of vent, extending in all directions.
Floating Roof	1	Area above the roof and within the shell.

*The release of Class I liquids may generate vapors to the extent that the entire building, and possibly a zone surrounding it, should be considered a Class I, Division 2 location.

**For Tanks - Underground, see s. Ind 8.505 of subch. 9.

Ind 8.385 [5-8] REPAIRS TO EQUIPMENT. Hot work, such as welding or cutting operations, use of spark-producing power tools, and chipping operations shall be permitted only under supervision of an individual in responsible charge. The individual in responsible charge shall make an inspection of the area to be sure that it is safe for the work to be done and that safe procedures will be followed for the work specified.

Ind 8.39 [5-9] HOUSEKEEPING. (1) [5-9.1] CONTROL OF LEAKAGE. Maintenance and operating practices shall be in accordance with established procedures which will tend to control leakage and prevent the accidental escape of flammable or combustible liquids. Spills shall be cleaned up promptly.

(2) [5-9.2] UNOBSTRUCTED AISLES. Unobstructed aisles at least 40 inches in width shall be maintained for movement of personnel and so that fire protection equipment can be brought to bear on any part of flammable or combustible liquid storage, use or any unit physical operation.

(3) [5-9.3] WASTE MATERIAL. Combustible waste material and residues in a building or unit operating area shall be kept to a minimum, stored in covered metal receptacles and disposed of daily.

(4) [5-9.4] MAINTENANCE OF GROUND AREAS. Ground area around buildings and unit operating areas shall be kept free of weeds, trash or other unnecessary combustible materials.

SUBCHAPTER 8
BULK PLANTS AND TERMINALS

Ind 8.40 [6-1] STORAGE. (1) [6-1.1] CLASS I LIQUIDS. Class I liquids shall be stored in closed containers, or in storage tanks aboveground outside of buildings, or underground in accordance with subch. 4.

(2) [6-1.2] CLASS II AND III LIQUIDS. Class II and Class III liquids shall be stored in containers, or in tanks within buildings or aboveground outside of buildings or underground in accordance with subch. 4.

(3) [6-1.3] CONTAINER STACKING. Containers of liquids when piled one upon the other shall be separated by dunnage sufficient to provide stability and to prevent excessive stress on container walls. The height of pile shall be consistent with stability and strength of containers.

(4) [6-1.4] PIPING, VALVES AND FITTINGS. Piping systems shall be in accordance with subch. 5.

Ind 8.405 [6-2] BUILDINGS. (1) [6-2.1] EXITS. Rooms in which liquids are stored or handled by pumps shall have exit facilities arranged to prevent occupants being trapped in the event of fire.

(2) [6-2.2] HEATING. Rooms in which Class I liquids are stored or handled shall be heated only by means not constituting a source of ignition, such as steam or hot water. Rooms containing heating appliances involving sources of ignition shall be located and arranged to prevent entry of flammable vapors.

(3) [6-2.3] VENTILATION. (a) [6-2.3.1] Ventilation shall be provided for all rooms, buildings or enclosures in which Class I liquids are pumped or dispensed. Design of ventilation systems shall take into account the relatively high specific gravity of the vapors. Ventilation may be provided by adequate openings in outside walls at floor level unobstructed except by louvers or coarse screens. Where natural ventilation is inadequate, mechanical ventilation shall be provided.

(b) [6-2.3.2] Class I liquids shall not be stored or handled within a building having a basement or pit into which flammable vapors may travel, unless such area is provided with ventilation designed to prevent the accumulation of flammable vapors therein.

(c) [6-2.3.3] Containers of Class I liquids shall not be drawn from or filled within buildings unless provision is made to prevent the accumulation of flammable vapors in hazardous concentrations. Where mechanical ventilation is required, it shall be kept in operation while flammable liquids are being handled.

Ind 8.41 [6-3] LOADING AND UNLOADING FACILITIES. (1) [6-3.1] SEPARATION. (a) Tank vehicle and tank car loading or unloading facilities shall be separated from aboveground tanks, warehouses, other plant buildings or nearest line of adjoining property that can be built upon by a distance of 25 feet for Class I liquids and at least 15 feet for Class II and Class III liquids measured from the nearest position of any fill spout. Buildings for pumps or shelters for personnel may be a part of the facility.

(b) Existing bulk plant facilities with clearances less than those specified in sub. (1) may be renovated or updated, but no additional storage capacity shall be permitted in violation of those specified clearances.

(2) [6-3.2] CROSS USE OF EQUIPMENT. Equipment such as piping, pumps and meters used for the transfer of Class I liquids between storage tanks and the fill stem of the loading rack shall not be used for the transfer of Class II or Class III liquids.

(3) [6-3.3] TOP LOADING. (a) [6-3.3.1] When top loading a tank vehicle with Class I and Class II liquids without vapor control, valves used for the final control of flow shall be of the self-closing type and shall be manually held open except where automatic means are provided for shutting off the flow when the vehicle is full.

(b) [6-3.3.2] When top loading a tank vehicle with vapor control, flow control shall be pursuant to subs. (4) (a) and (4) (b).

(4) [6-3.4] BOTTOM LOADING. (a) [6-3.4.1] When bottom loading a tank vehicle, with or without vapor control, a positive means shall be provided for loading a predetermined quantity of liquid, together with an automatic secondary shut-off control to prevent overflow. The connecting components between the loading rack and the tank vehicle required to operate the secondary control shall be functionally compatible.

(b) [6-3.4.2] When bottom loading a tank vehicle that is equipped for vapor control, but when vapor control is not used, the tank shall be vented to the atmosphere to prevent pressurization of the tank. Such venting shall be at a height not lower than the top of the cargo tank on the vehicle.

(c) [6-3.4.3] When bottom loading a tank vehicle, the coupling between the liquid loading hose or pipe and the truck piping shall be by means of a dry disconnect coupling.

(5) [6-3.5] CONNECTIONS. Connections to the plant vapor control system shall be designed to prevent the escape of vapor to the atmosphere when not connected to a tank vehicle.

(6) [6-3.6] VAPOR PROCESSING EQUIPMENT. Vapor processing equipment shall be separated from aboveground tanks, warehouses, other plant buildings, loading and unloading facilities, or nearest line of adjoining property that can be built upon, by a distance of at least 25 feet. Vapor processing equipment shall be protected against physical damage by remote location or by the provisions of guard rails, curbs, or fencing.

(7) [6-3.7] STATIC PROTECTION. Bonding facilities for protection against static sparks during the loading of tank vehicles through open domes shall be provided where Class I liquids are loaded or where Class II or Class III liquids are loaded into vehicles which may contain vapors from previous cargoes of Class I liquids.

(a) [6-3.7.1] Protection as required in this subsection shall consist of a metallic bond wire permanently electrically connected to the fill stem or to some part of the rack structure in electrical contact with the fill stem. The free end of such wire shall be provided with a clamp or equivalent device for convenient attachment to some metallic part in electrical contact with the cargo tank of the tank vehicle.

(b) [6-3.7.2] Such bonding connection shall be made fast to the vehicle or tank before dome covers are raised and shall remain in place until filling is completed and all dome covers have been closed and secured.

(c) [6-3.7.3] Bonding as specified in this subsection is not required:

1. Where vehicles are loaded exclusively with products not having a static accumulating tendency, such as asphalts including cutback asphalts, most crude oils, residual oils and water soluble liquids;

2. Where no Class I liquids are handled at the loading facility and the tank vehicles loaded are used exclusively for Class II and Class III liquids; and

3. Where vehicles are loaded or unloaded through closed bottom or top connections whether the hose or pipe is conductive or nonconductive.

(8) [6-3.8] STRAY CURRENTS. Tank car loading facilities where flammable and combustible liquids are loaded or unloaded through open domes shall be protected against stray currents by permanently bonding the pipe to at least one rail and to the rack structure, if of metal. Multiple pipes entering the rack area shall be permanently electrically bonded together. In addition, in areas where excessive stray currents are known to exist, all pipe entering the rack area shall be provided with insulating sections to electrically isolate the rack piping from the pipe lines. These precautions are not necessary where Class II or Class III liquids are handled exclusively and there is no probability that tank cars will contain vapors from previous cargoes of Class I liquids. Temporary bonding is not required between the tank car and the rack or piping during either loading or unloading irrespective of the class of liquid handled.

(9) [6-3.9] CONTAINER FILLING FACILITIES. Class I liquids shall not be dispensed into metal containers unless the nozzle or fill pipe is in electrical contact with the container. This may be accomplished by maintaining metallic contact during filling, by a bond wire between them or by other conductive path having an electrical resistance not greater than 10^6 ohms. Bonding is not required where a container is filled through a closed system, or is made of glass or other nonconducting material.

Ind 8.415 TOP LOADING. (1) OPEN DOME LOADING. (a) Filling through open domes into tank vehicles or tank cars shall be accomplished by a submerged nonsparking metal fill pipe extending to near the tank bottom.

(b) This provision shall apply to all loading facilities now in existence and hereafter constructed.

(2) LOADING PROCEDURES. Every new and existing bulk plant and terminal loading at a rate of 250 gallons per minute or more shall have the following equipment for top loading, and follow the specified procedures:

(a) All fill tubes shall be of metal or other suitable material with an equivalent electrical conductance.

(b) All fill tubes delivering at or above a velocity of 15 feet per second shall be equipped with a deflector made of metal or other suitable material with an equivalent electrical conductance, so as to maintain the fill tube in place during the loading operation.

(c) All compartment dome covers shall be closed when compartment is not being loaded.

(d) On a switch load, the bottom of the fill tube be placed as near as possible to the bottom of the tank.

(e) On a switch load, the fill tubes shall be in approximately the vertical position at all times during loading.

(f) On a switch load, the velocity shall not exceed 15 feet per second until the top of the fill tube deflector is covered.

(g) On a switch load, all compartments shall be drained before loading.

Note: Loading procedures are also subject to Wisconsin Administrative Rules of the Department of Natural Resources.

(3) SAFETY PROCEDURES. There shall be established for each bulk plant and terminal, safety procedures for the filling and discharging of cargo tanks (as may be appropriate for the particular operations of the bulk plant or terminal) and such safety procedures, along with a copy of sub. (2) shall be readily available or conspicuously posted at each bulk plant and terminal.

Ind 8.42 TANK CAR UNLOADING. (1) DOME (MANHOLE) UNLOADING. Liquids having a flash point below 100 degrees F. shall not be withdrawn from tank cars from bottom outlets, but shall be unloaded only through the dome (manhole).

(2) APPROVED BOTTOM OUTLET UNLOADING. Written approval from the department shall be obtained prior to unloading liquids having a flash point between 100 - 150 degrees F. from the bottom outlet.

(3) PROHIBITED UNLOADING PROCEDURES. Unloading from tank cars into tank vehicles or any portable container is prohibited.

(4) CONNECTED TANK CARS. When tank cars are connected for the purpose of loading or unloading, a sign reading "Tank Car Connected" shall be displayed.

Note: For additional information and related requirements, see code of Federal Regulations, chapter I, title 49 - Transportation and Wisconsin Administrative Rules of the Department of Natural Resources (DNR).

Ind 8.425 FILLING AND EMPTYING CONTAINERS. Containers of Class I flammable liquids shall not be drawn from or filled within buildings unless provision is made to prevent the accumulation of flammable vapors in hazardous concentrations.

Ind 8.43 VEHICLE REFUELING AT BULK PLANTS. (1) PROHIBITED PRACTICES. No motor fuel or special fuel as defined in s. 78.04, Stats., shall be dispensed at any bulk plant directly into the fuel tank of a customer's motor vehicle when such tanks are connected to the carburetor system of such vehicle.

(a) Exception. Vehicles may be serviced by qualified bulk plant personnel through an approved dispensing pump connected with an underground storage tank.

(2) DISPENSER LOCATION. Approved key operated pumps without monetary totalizer panels and other dispensing devices shall not be installed nearer than 25 feet of any pump house or loading rack adjoining property lines.

(3) DISPENSING DEVICES. Dispensing devices shall be installed in accordance with the provisions of s. Ind 8.495.

Ind 8.435 BULK PLANT PRODUCT COLOR CODING. (1) STANDARD COLOR CODE. All piping shall be identified by the following standard color coding:

- | | |
|-------------------------------|--|
| (a) Premium Gasoline | Red with the words "Prem. Gas" |
| (b) Regular Gasoline | Blue with the words "Reg. Gas" |
| (c) Regular Unleaded Gasoline | White with black crosses with the words "Reg. No-Lead" |
| (d) Premium Unleaded Gasoline | Red with white crosses with the words "Prem. No-Lead" |
| (e) Gasohol | Black with the word "Gasohol" in white |
| (f) Diesel Fuel | Yellow with the word "Diesel" |
| (g) #1 Fuel Oil | Purple with yellow slash with the words "#1 Oil" |
| (h) #2 Fuel Oil | Green with the words "#2 Oil" |

- (i) Kerosene Brown with the word "Kerosene"
- (j) Alcohol White with the word "Alcohol"
- (k) Vapor Recovery Orange with the word "Vapor"

(2) TYPE OF IDENTIFICATION. The product identification shall be accomplished by the use of a disc type tag of nonsparking material, not less than 6 inches diameter bearing the color code and the name of the product.

(3) LOCATION OF IDENTIFICATION. Tags shall be permanently affixed to the valve at the unloading riser, the pump control valves, the valve of a storage tank and load rack and on the product pipe lines in at least 3 locations equally spaced between terminating points or valves.

(4) EFFECTIVE DATE. All bulk plants shall comply with the requirements of this section within 180 days after the effective date of this section.

Ind 8.44 [6-4] WHARVES. (1) [6-4.1] APPLICATION. The term wharf shall mean any wharf, pier, bulkhead or other structure over or contiguous to navigable water, the primary function of which is the transfer of liquid cargo in bulk between shore installations and any tank vessel, ship, barge, lighter boat or other mobile floating craft; and this section shall apply to all such installations, except Marine Service Stations as covered in subch. 9.

(a) [6-4.1.1] Package cargo of liquids, including full and empty drums, bulk fuel and stores may be handled over a wharf during cargo transfer at such times and places as agreed upon by the wharf superintendent and the senior deck officer on duty.

(b) [6-4.1.2] Wharves at which liquid cargoes are to be transferred in bulk quantities to or from tank vessels shall be at least 100 feet from any bridge over a navigable waterway, or from an entrance to or superstructure of any vehicular or railroad tunnel under a waterway. The termination of the wharf loading or unloading fixed piping shall be at least 200 feet from a bridge or from an entrance to or superstructure of a tunnel.

(2) [6-4.2] CONSTRUCTION REQUIREMENTS. Substructure and deck shall be substantially designed for the use intended. Deck may employ any material which will afford the desired combination of flexibility, resistance to shock, durability, strength and fire resistance. Heavy timber construction is acceptable.

(3) [6-4.3] TANK DESIGN. Tanks used exclusively for ballast water or Class II or Class III liquids may be installed on suitably designed wharves.

(4) [6-4.4] PRESSURE RELIEF. Loading pumps capable of building up pressures in excess of the safe working pressure of cargo hose or loading arms shall be provided with by-passes, relief valves or other arrangement to protect the loading facilities against excessive pressure. Relief devices shall be tested at not more than yearly intervals to determine that they function satisfactorily at the pressure at which they are set.

(a) [6-4.4.1] All pressure hoses and couplings shall be inspected at intervals appropriate to the service. With the hose extended, the hose and couplings shall be tested using the "in service maximum operating pressures." Any hose showing material deteriorations, signs of leakage or weakness in its carcass or at the couplings shall be withdrawn from service and repaired or discarded.

(5) [6-4.5] PIPING, VALVES AND FITTINGS. Piping, valves and fittings shall be in accordance with subch. 5, with the following exceptions and additions:

(a) [6-4.5.1] Flexibility of piping shall be assured by appropriate layout and arrangement of piping supports so that motion of the wharf structure resulting from wave action, currents, tides or the mooring of vessels will not subject the pipe to repeated strain beyond the elastic limit.

(b) [6-4.5.2] Pipe joints depending upon the friction characteristics of combustible materials or grooving of pipe ends for mechanical continuity of piping shall not be used.

(c) [6-4.5.3] Swivel joints may be used in piping to which hoses are connected, and for articulated swivel-joint transfer systems, provided that the design is such that the mechanical strength of the joint will not be impaired if the packing material should fail, as by exposure to fire.

(d) [6-4.5.4] In addition to the requirements of s. Ind 8.295, each line conveying Class I and Class II liquids leading to a wharf shall be provided with a readily accessible block valve located on shore near the approach to the wharf and outside of any diked area. Where more than one line is involved, the valves shall be grouped in one location.

(e) [6-4.5.5] Means of easy access shall be provided for cargo line valves located below the wharf deck.

(f) [6-4.5.6] Pipe lines on wharves shall be adequately bonded and grounded if Class I and Class II liquids are handled. If excessive stray currents are encountered, insulating joints shall be installed. Bonding and grounding connections on all pipe lines shall be located on the wharf side of hose riser insulating flanges, if used, and shall be accessible for inspection.

(g) [6-4.5.7] Hose or articulated swivel-joint pipe connections used for cargo transfer shall be capable of accommodating the combined effects of change in draft and maximum tidal range, and mooring lines shall be kept adjusted to prevent surge of the vessel from placing stress on the cargo transfer system.

(h) [6-4.5.8] Hose shall be supported so as to avoid kinking and damage from chafing.

Ind 8.445 [6-5] ELECTRICAL EQUIPMENT. (1) [6-5.1] APPLICATION. This section shall apply to areas where Class I liquids are stored or handled. For areas where Class II or Class III liquids only are stored or handled, the electrical equipment may be installed in accordance with the provisions of ch. ILHR 16, Wis. Adm. Code, for ordinary locations.

(2) [6-5.2] GENERAL. All electrical equipment and wiring shall be of a type specified by and shall be installed in accordance with ch. ILHR 16, Wis. Adm. Code.

(3) [6-5.3] EXCEPTION FOR ENCLOSURE. So far as it applies, Table 8.445-1 shall be used to delineate and classify areas for the purpose of installation of electrical equipment under normal circumstances. In Table 8.445-1 classified area shall not extend beyond an unpierced wall, roof or other solid partition. The designation of classes and divisions is defined in ch. ILHR 16, Wis. Adm. Code.

Table 8.445-1
Electrical Equipment Classified Areas - Bulk Plants

Location	National Electrical Code Class I, Group D Division	Extent of Classified Area
TANK VEHICLE AND TANK CAR*		
Loading Through Open Dome	1	Within 3 feet of edge of dome, extending in all directions.
	2	Area between 3 feet and 15 feet from edge of dome, extending in all directions.
Loading Through Bottom Connections With Atmospheric Venting	1	Within 3 feet of point of venting to atmosphere extending in all directions.
	2	Area between 3 feet and 15 feet from point of venting to atmosphere, extending in all directions. Also, up to 18 inches above grade within a horizontal radius of 10 feet from point of loading connection.
Loading Through Closed Dome With Atmospheric Venting	1	Within 3 feet of open end of vent, extending in all directions.
	2	Area between 3 feet and 15 feet from open end of vent, extending in all directions. Also, within 3 feet of edge of dome, extending in all directions.
Loading Through Closed Dome With Vapor Recovery	2	Within 3 feet of point of connection of both fill and vapor lines, extending in all directions.
	2	Within 3 feet of point of connections extending in all directions. Also, up to 18 inches above grade within a horizontal radius of 10 feet from point of connection.

*When classifying extent of area, consideration shall be given to fact that tank cars or tank vehicles may be spotted at varying points. Therefore, the extremities of the loading or unloading positions shall be used.

Table 8.445-1 (Continued)

Location	National Electrical Code Class I, Group D Division	Extent of Classified Area
DRUM AND CONTAINER FILLING		
Outdoors, or Indoors With Adequate Ventilation	1	Within 3 feet of vent and fill opening, extending in all directions.
	2	Area between 3 feet and 5 feet from vent or fill opening, extending in all directions. Also, up to 18 inches above floor or grade level within a horizontal radius of 10 feet from vent or fill opening.
TANK - ABOVEGROUND*		
Shell, Ends, or Roof and Dike Area	2	Within 10 feet from shell, ends, or roof of tank. Area inside dikes to level of top of dike.
Vent	1	Within 5 feet of open end of vent, extending in all directions.
	2	Area between 5 feet and 10 feet from open end of vent, extending in all directions.
Floating Roof	1	Area above the roof and within the shell.
PITS		
Without Mechanical Ventilation	1	Entire area within pit if any part is within a Division 1 or 2 classified area.
With Mechanical Ventilation	2	Entire area within pit if any part is within a Division 1 or 2 classified area.
Containing Valves, Fit- tings or Piping, and Not Within a Division 1 or 2 Classified Area	2	Entire pit.

*For Tanks - Underground, see s. Ind 8.505 of subch. 9.

Table 8.445-1 (Continued)

Location	National Electrical Code Class I, Group D Division	Extent of Classified Area
PUMPS, BLEEDERS, WITHDRAWAL FITTINGS, METERS AND SIMILAR DEVICES		
Indoors	2	Within 5 feet of any edge of such devices, extending in all directions. Also, up to 3 feet above floor or grade level within 25 feet horizontally from any edge of such devices.
Outdoors	2	Within 3 feet of any edge of such devices, extending in all directions. Also, up to 18 inches above grade level within 10 feet horizontally from any edge of such devices.
STORAGE AND REPAIR GARAGE FOR TANK VEHICLES	1	All pits or spaces below floor level.
	2	Area up to 18 inches above floor or grade level for entire storage or repair garage.
DRAINAGE DITCHES, SEPARATORS, IMPOUNDING BASINS	2	Area up to 18 inches above ditch, separator or basin. Also, up to 18 inches above grade within 15 feet horizon- tally from any edge.
GARAGES FOR OTHER THAN TANK VEHICLES	Ordinary	If there is any opening to these rooms within the extent of an outdoor classified area, the entire room shall be classified the same as the area classifica- tion at the point of the opening.
OUTDOOR DRUM STORAGE	Ordinary	
INDOOR WAREHOUSING WHERE THERE IS NO FLAMMABLE LIQUID TRANSFER	Ordinary	If there is any opening to these rooms within the extent of an indoor classified area, the room shall be classified the same as if the wall, curb or partition did not exist.
OFFICE AND REST ROOMS	Ordinary	

(4) [6-5.4] SPECIAL CONDITIONS. The area classifications listed in sub. (3) shall be based on the premise that the installation meets the applicable requirements of this chapter in all respects. Should this not be the case, the authority having jurisdiction shall have the authority to classify the extent of the classified area.

Ind 8.45 [6-6] SOURCES OF IGNITION. Class I liquids shall not be handled, drawn or dispensed where flammable vapors may reach a source of ignition. Smoking shall be prohibited except in designated localities. "NO SMOKING" signs shall be conspicuously posted where hazard from flammable vapors is normally present.

Ind 8.455 [6-7] DRAINAGE AND WASTE DISPOSAL. Provision shall be made to prevent liquids which can be spilled at loading or unloading points from entering public sewers and drainage systems, or natural waterways. Connection to such sewers, drains or waterways by which liquids might enter shall be provided with separator boxes or other approved means whereby such entry is precluded. Crankcase drainings and liquids shall not be dumped into sewers, but shall be stored in tanks or tight drums outside of any building until removed from the premises.

Ind 8.46 [6-8] FIRE CONTROL. (1) [6-8.1] FIRE EXTINGUISHERS. Listed portable fire extinguishers of appropriate size, type and number shall be provided. At least one extinguisher with a minimum classification of 20-B shall be provided at each loading or unloading facility. Where piped water is available, ready-connected hose in size appropriate for the water supply shall be provided at locations where fires are likely to occur.

(2) [6-8.2] PLANT MAINTENANCE. All plant fire protection facilities shall be adequately maintained and periodically inspected and tested to make sure they are always in satisfactory operating condition, and they will serve their purpose in time of emergency.

(3) [6-8.3] EMERGENCY PROCEDURE PLANS. Bulk plants and terminals shall have a written emergency procedure plan. The plan shall be designed to minimize the hazard to the public and to plant employes in the event of a fire or other emergency conditions. The plan shall be posted, or located in a strategic and accessible location. Plant personnel assigned to emergency duties shall be trained in these duties.

Ind 8.465 [6-4.7] PROCEDURES. (1) LOADING OR DISCHARGING. Loading or discharging shall not commence until the wharf superintendent and the officer in charge of the tank vessel agree that the tank vessel is properly moored and all connections are properly made.

(2) [6-4.7.1] MECHANICAL WORK. Mechanical work shall not be performed on the wharf during cargo transfer, except under special authorization based on a review of the area involved, methods to be employed and precautions necessary.

Ind 8.47 CARE AND ATTENDANCE OF PROPERTY. Plant and tank yard shall be kept free from weeds, high grass, rubbish and litter, and shall be kept neat, clean and orderly throughout.

SUBCHAPTER 9
SERVICE STATIONS

ALL SERVICE STATIONS

Note: See chs. Ind 50-64, Wis. Adm. Code for rules addressing construction, heating and ventilating of service stations. See ch. ILHR 16, Wis. Adm. Code for rules addressing electrical systems in service stations.

Ind 8.48 STORAGE AND HANDLING. (1) STORAGE. Flammable and combustible liquids shall be stored as specified in s. Ind 8.535 in approved closed containers not exceeding 60 gallons capacity, in tanks located underground, in tanks in special enclosures or in aboveground tanks, except as follows:

(a) The temporary use of movable tanks in conjunction with the dispensing of flammable or combustible liquids into the fuel tanks of motor vehicles or other motorized equipment on premises not normally accessible to the public.

1. The temporary use of movable tanks shall be approved in writing by the department or authorized deputy for a time period not to exceed 30 days.

2. Extensions of time beyond the 30 days may be granted in writing by the department or authorized deputy.

(b) The dispensing of flammable liquids in the open from a tank vehicle to a motor vehicle under the following conditions:

1. The tank vehicle conforms to the requirements of NFPA No. 385 and other applicable requirements of this chapter.

2. The dispensing is done on premises not open to the public.

3. The motor vehicles are owned or operated by a commercial, industrial or governmental agency.

4. The dispensing hose does not exceed 150 feet in length.

5. The dispensing nozzle is a listed automatic closing type without latch open device.

6. An inspection of the premises and operations has been made and approval granted by a deputy of the department.

(2) FLAMMABLE AND COMBUSTIBLE LIQUID TRANSFER. Flammable and combustible liquid shall not be transferred from aboveground bulk storage tanks to any underground storage tanks, except for the normal transfer of flammable and combustible liquid from over the road tank vehicles to underground tanks.

(3) BUILDINGS WITH BASEMENTS OR PITS. Class I liquids shall not be stored or handled within a building having a basement or pit into which flammable vapors may travel, unless such area is provided with ventilation designed to prevent the accumulation of flammable vapors.

(4) INVENTORY RECORDS.

(a) An inventory shall be kept on a weekly basis for each tank system at each location by the owner or operator.

(b) Inventory records for at least the previous year shall be kept and shall be made available for review upon request of the department or authorized deputy.

(c) The inventory records shall be based upon the actual weekly measurement of tank liquid level and weekly use of a water detector. The records shall be reconciled to indicate the amount of gain or loss of product in gallons.

Note #1: Tank and system leakage can be first detected by accurate inventory records.

Note #2: The recording of pump meter readings combined with in-shipment records do not constitute adequate inventory records for the purpose of this section.

1. 'Exception'. The requirement for weekly inventory records does not apply to the following:

a. Those installations that permit visual detection of leaks in all surfaces of tanks and entire piping system connected thereto.

b. Storage tanks connected to oil burning equipment.

(d) The written record of such weekly inventory shall include a computation of gain or loss for the period.

(e) The operator of the location shall be responsible for immediately notifying the local fire chief of any abnormal loss or gain or spillage and for notifying the owner or designated representative of the corrective action required.

Ind 8.485 EXISTING STORAGE TANKS. (1) RESPONSIBILITIES. (a) The owner of storage tanks for flammable and combustible liquids shall be responsible for the integrity of each and all tanks at the location, together with the piping and dispensing systems.

(b) The party responsible for leak or spill of flammable or combustible liquids shall take corrective procedures to eliminate hazard.

(2) EMERGENCY INVOLVING HAZARD. (a) The owner or operator of said location shall be responsible for taking directed and necessary action including, if required, the emptying of all station tankage and the deactivation of all systems if after proper investigation, the department or deputy of the department duly declares an emergency involving hazard to public health and safety. The tankage and system shall not be operated until tested, and declared safe by the department.

(b) The department and its deputies are authorized to determine the integrity of tanks with their attached dispensing systems, and to notify owners of conditions which may indicate potential danger to the public or the environment.

(3) TESTING OF TANKS AND SYSTEMS. (a) The department or a deputy of the department shall conduct an investigation to determine if testing is necessary.

(b) If testing is necessary, the department shall issue an order to the owner or operator requiring subject tanks and equipment to be tested.

(c) The owner shall be consulted and advised regarding any determination of the integrity of the tank or system or both in connection with the issuance of an order for testing.

(d) The test shall be conducted in the presence of a member of the department or designated representative and shall be certified by that individual. The owner shall not be responsible for costs incurred by the department or its authorized agents in witnessing or certifying the test results.

(e) Tanks and attached systems shall be subjected to a witnessed and certified test procedure using an approved tank system tightness tester or its equivalent.

Note: The department will accept nationally recognized test procedures and standards.

(f) Corrective procedures shall be dictated by the facts disclosed and as directed by the department.

(g) Findings of the certified test shall be binding and the owner shall be responsible for complying with the specified corrective actions.

(4) [7-2.2] SPECIAL ENCLOSURES. (a) [7-2.2.1] When installation of tanks in accordance with s. Ind 8.21 is impractical because of property or building limitations, tanks for liquids may be installed in buildings if enclosed as described in par. (b) and upon specific approval of the authority having jurisdiction.

(b) [7-2.2.2] Enclosure shall be substantially liquid-and vapor-tight without backfill. Sides, top and bottom of the enclosure shall be of reinforced concrete at least 6 inches thick, with openings for inspection through the top only. Tank connections shall be so piped or closed that neither vapors nor liquid can escape into the enclosed space. Means shall be provided to use portable equipment to discharge to the outside any liquid or vapors which might accumulate should leakage occur.

(c) [7-2.2.3] At automotive service stations provided in connection with tenant or customer parking facilities at or below grade level in large buildings of commercial, mercantile or residential occupancy, tanks containing Class I liquids installed in accordance with par. (b) shall not exceed 6,000 gallons individual or 18,000 gallons aggregate capacity.

(5) [7-2.3] INSIDE BUILDINGS. (a) [7-2.3.1] Except where stored in tanks as provided in sub. (4) no Class I liquids shall be stored within any service station building except in closed containers of aggregate capacity not exceeding 120 gallons. One container not exceeding 60 gallons capacity equipped with a listed pump is permitted.

(b) [7-2.3.2] Class I liquids may be transferred from one container to another in lubrication or service rooms of a service station building provided the electrical installation complies with Table 8.505-1 and provided that any heating equipment complies with s. Ind 8.51.

(c) [7-2.3.3] Class II and Class III liquids may be stored and dispensed inside service station buildings from tanks of not more than 120 gallons each.

Ind 8.49 ATTENDANCE OR SUPERVISION OF DISPENSING. (1) STATIONS OPEN TO PUBLIC. Each service station open to the public shall have an attendant or supervisor on duty whenever the station is open for business. The attendant shall supervise individual dispensing devices except as provided in ss. Ind 8.43 and 8.495.

Note: See s. Ind 8.53 (2) and (3) for attendant's duties at self-service stations.

(2) [7-8.3.3] STATIONS CLOSED TO THE PUBLIC. Dispensing of liquids at private locations where the dispensing equipment is not open to the public, does not require an attendant or supervisor. Such locations may include key, card or code controlled dispensers.

Ind 8.495 DISPENSING SYSTEMS. (1) GENERAL. (a) Class I liquids shall be transferred from tanks by means of fixed pumps so designed and equipped as to allow control of the flow and to prevent leakage or accidental discharge.

(b) Approved pumps taking suction through the top of the container shall be used.

(c) Class I liquids shall not be dispensed by pressure from drums, barrels and similar containers.

(2) APPROVED DISPENSING UNITS. (a) Dispensing devices for Class I liquids shall be of approved type.

(b) Automatic dispensing units shall be Underwriters' Laboratories listed special devices.

(c) Approved money operated, card operated, remote pre-set type and other dispensing units may be used at service stations provided the following conditions are satisfied:

1. Dispensing of Class I liquids is under the observation of an authorized attendant at all times, except as specified in par. (d).

a. The observation and control of the special dispensing device shall be the primary function of the attendant.

b. The attendant shall be regularly instructed in all appropriate regulations pertaining to dispensing, use of approved containers and smoking restrictions.

2. Emergency controls shall be clearly identified, easily accessible and shall be located within 15 feet of attendant's control station.

(d) 1. Key, card or code operated dispensing devices shall be listed by Underwriters' Laboratories, shall be subject to specific written approval by the department and shall be permitted only in the following applications:

a. Dispensing of liquids at private locations, where the dispensing equipment is not open to the public provided the dispensing of liquids is limited to authorized personnel of these establishments for the purpose of fueling vehicles used in connection with such establishments. Such private locations may include but is not limited to commercial, industrial, governmental or manufacturing establishments.

b. Dispensing of liquids at self-service stations provided the dispensing of liquids is limited to authorized individuals for the purpose of fueling vehicles.

2. The use of key, card or code operated devices as specified in subd. 1. shall not require an attendant or supervisor.

3. The provisions of this paragraph shall apply to all key, card or code operated dispensing devices installed on or after the effective date of this paragraph and to those previously installed.

(3) EMERGENCY POWER CUTOFF. A clearly identified and easily accessible switch or a circuit breaker shall be provided at a location remote from dispensing devices, including remote pumping systems, to shut off the power to all dispensing devices in the event of an emergency.

(4) PROTECTION OF DISPENSING UNITS. Dispensing units shall be mounted on either a concrete island or shall be protected against damage by collision.

(a) Exception. Dispensing units attached to containers are exempt from this subsection.

(5) OUTSIDE LOCATION. Dispensing devices shall be located as follows:

(a) Outside of Buildings.

1. Above grade;

2. Ten feet or more from adjoining property lines;

3. Ten feet or more from any right of way; and
4. Five feet or more from any building opening.

(b) Inside of Buildings. Where outside dispenser location is not practical, dispensers, conforming to the requirements of sub. (7), may be installed inside buildings.

(6) OUTSIDE LOCATION AT SERVICE STATIONS AND SELF-SERVICE STATIONS. Dispensing devices at service stations or self-service stations shall be installed on service station property and be so located that all parts of the vehicle being served will be on the premises of the station.

(7) INSIDE LOCATION. Approved dispensers may be located inside buildings with written approval of the department and provided the following conditions are satisfied:

(a) The dispensing area shall be separated from other areas in a manner approved by the department.

(b) Openings beneath the dispenser enclosure shall be sealed to prevent the flow of leaking fuel to lower building spaces.

(c) The dispensing unit and its piping shall be located in a position where it cannot be struck by an out-of-control vehicle descending a ramp or other slope.

(d) The dispensing area shall be provided with an approved mechanical ventilation system.

1. The ventilation system shall be electrically interlocked with the dispensing unit so that the dispensing unit cannot be operated unless the ventilating fan motors are energized.

2. The intake to the exhaust duct shall be located within 5 feet of the dispensing unit and within 18 inches of the floor.

(e) When dispensing units are located below grade the entire dispensing area shall be protected by an approved automatic sprinkler system.

(f) The required emergency power cutoff switch or circuit breaker shall be located within 25 feet of the dispensing unit.

(8) DELIVERY NOZZLES. (a) [7-8.1.1] Hose nozzle valves for dispensing Class I liquids at any service station open to the public shall be of a listed automatic closing type with or without a latch-open device.

(b) The hoses attached to the nozzles shall be free of leaks and shall be maintained in an operable condition.

(c) [7-8.1.5] A hose nozzle valve used for dispensing Class I liquids into a container shall be manually held open during the dispensing operation.

(9) [7-3.2] REMOTE PUMPING SYSTEMS. (a) [7-3.2.1] This section shall apply to systems for dispensing Class I liquids where such liquids are transferred from storage to individual or multiple dispensing units by pumps located elsewhere than at the dispensing units.

(b) [7-3.2.2] Pumps shall be designed or equipped so that no part of the system will be subjected to pressures above its allowable working pressure. Each pump shall have installed on the discharge side an approved leak detection device which will provide an indication if the piping and dispensers are not essentially liquid-tight.

(c) [7-4.3.3] A control shall be provided that will permit the pump to operate only when a dispensing nozzle is removed from its bracket on the dispensing unit and the switch on this dispensing unit is manually actuated. This control shall also stop the pump when all nozzles have been returned to their brackets.

(d) [7-3.2.5] An approved impact valve, incorporating a fusible link, designed to close automatically in event of severe impact or fire exposure shall be properly installed in the dispensing supply line at the base of each individual dispensing device. There shall be a means, visible from any operating area, such as lube room, office and pump island, to indicate when the pump motor is running.

(e) [7-3.2.6] A vapor return pipe inside the dispenser housing shall have a shear section or flexible connector so that the liquid emergency shut-off valve will function as specified in par. (d).

(10) APPLICATION. When any changes or replacement of storage tanks, dispensing devices or related piping is made, the entire system shall conform to the requirements of subs. (1) through (9).

Ind 8.50 DISPENSING INTO PORTABLE CONTAINERS. (1) LIQUIDS HAVING A FLASH POINT OF LESS THAN 100 DEGREES F. Dispensing of any liquids having a flash point of less than 100 degrees F. into portable containers or portable tanks shall be prohibited unless the containers or tanks are listed or classified by Underwriters' Laboratories or are constructed of metal having a tight closure with screwed or spring cover, and are fitted with a spout or so designed that the contents can be poured without spilling. Such containers or tanks shall be substantially a bright red color.

(2) LIQUIDS HAVING A FLASH POINT OF 100 DEGREES F. OR MORE. No kerosene, fuel oil or similar liquids having a flash point of 100 degrees F. or more shall be dispensed into any portable container or portable tank colored red.

Ind 8.505 [7-6] ELECTRICAL EQUIPMENT. (1) [7-6.1] APPLICATION. This section shall apply to areas where Class I liquids are stored, handled or dispensed. For areas where Class II or Class III liquids are stored, handled or dispensed, the electrical equipment shall be installed pursuant to ch. ILHR 16, Wis. Adm. Code, for nonclassified locations.

(2) [7-6.2] GENERAL. All electrical equipment and wiring shall be of a type specified by and shall be installed in accordance with the provisions of ch. ILHR 16, Wis. Adm. Code.

(3) [7-5.3] CLASSIFICATION OF AREAS. Table 8.505-1 shall be used to delineate and classify areas for the purpose of installation of electrical equipment under normal circumstances. A classified area shall not extend beyond an unpierced wall, roof or other solid partition. The designation of classes and divisions is defined in ch. ILHR 16, Wis. Adm. Code.

Table 8.505-1
Electrical Equipment Classified Areas - Service Stations

Location	National Electrical Code Class I, Group D Division	Extent of Classified Area
UNDERGROUND TANK		
Fill Opening	1	Any pit, box or space below grade level, any part of which is within the Division 1 or 2 classified area.
	2	Up to 18 inches above grade level within a horizontal radius of 10 feet from a loose fill connection and within a horizontal radius of 5 feet from a tight fill connection.
Vent - Discharging Upward	1	Within 3 feet of open end of vent, extending in all directions.
	2	Area between 3 feet and 5 feet of open end of vent, extending in all directions.
DISPENSING UNITS (except overhead type)		
Pits	1	Any pit, box or space below grade level, any part of which is within the Division 1 or 2 classified area.
Dispenser	1	The area within a dispenser enclosure up to 4 feet vertically above the base except that area defined as Division 2. Any area within a nozzle boot.
	2	Areas within a dispenser enclosure above the Division 1 area. Areas within a dispenser enclosure isolated from Division 1 by a solid partition or a solid nozzle boot but not completely surrounded by Division 1 area. Within 18 inches horizontally in all directions from the Division 1 area located within the dispenser enclosure.

Table 8.505-1 (Continued)
 Electrical Equipment Classified Areas - Service Stations

Location	National Electrical Code Class I, Group D Division	Extent of Classified Area
DISPENSING UNITS (continued)		
Within 18 inches horizontally in all directions from the opening of a nozzle boot not isolated by a vapor-tight partition, except that the classified area need not be extended around a 90° or greater corner.		
Outdoor	2	Up to 18 inches above grade level within 20 feet horizontally of any edge of enclosure.
Indoor with Mechanical Ventilation	2	Up to 18 inches above grade or floor level within 20 feet horizontally of any edge of enclosure.
with Gravity Ventilation	2	Up to 18 inches above grade or floor level within 25 feet horizontally of any edge of enclosure.
DISPENSING UNITS, OVERHEAD TYPE	1	Within the dispenser enclosure and 18 inches in all directions from the enclosure where not suitably cut off by ceiling or wall. All electrical equipment integral with the dispensing hose or nozzle.
	2	An area extending 2 feet horizontally in all directions beyond the Division 1 area and extending to grade below this classified area.
	2	Up to 18 inches above grade level within 20 feet horizontally measured from a point vertically below the edge of any dispenser enclosure.

Table 8.505-1 (Continued)
 Electrical Equipment Classified Areas - Service Stations

Location	National Electrical Code Class I, Group D Division	Extent of Classified Area
REMOTE PUMP - OUTDOOR	1	Any pit, box or space below grade level if any part is within a horizontal distance of 10 feet from any edge of pump.
	2	Within 3 feet of any edge of pump, extending in all directions. Also up to 18 inches above grade level within 10 feet horizontally from any edge of pump.
REMOTE PUMP - INDOOR	1	Entire area within any pit.
	2	Within 5 feet of any edge of pump, extending in all directions. Also up to 3 feet above floor or grade level within 25 feet horizontally from any edge of pump.
LUBRICATION OR SERVICE ROOM with Dispensing	1	Any pit within any unventilated area.
	2	Any pit with ventilation.
	2	Area up to 18 inches above floor or grade level and 3 feet horizontally from a lubrication pit.
Dispenser for Class I Liquids	2	Within 3 feet of any fill or dispensing point, extending in all directions.
LUBRICATION OR SERVICE ROOM without Dispensing	2	Entire area within any pit used for lubrication or similar services where Class I liquids may be released.
	2	Area up to 18 inches above any such pit, and extending a distance of 3 feet horizontally from any edge of the pit.

Table 8.505-1 (Continued)
 Electrical Equipment Classified Areas - Service Stations

Location	National Electrical Code Class I, Group D Division	Extent of Classified Area
SPECIAL ENCLOSURE INSIDE		
BUILDING PER S. IND 8.101(4)	1	Entire enclosure.
SALES, STORAGE AND REST ROOMS	Nonclassified	If there is any opening to these rooms within the extent of a Division 1 area, the entire room shall be classified as Division 1.
VAPOR PROCESSING SYSTEMS PITS	1	Any pit, box or space below grade level, any part of which is within a Division 1 or 2 classified area or which houses any equipment used to transport or process vapors.
VAPOR PROCESSING EQUIPMENT LOCATED WITHIN PROTECTIVE ENCLOSURES	2	Within any protective enclosure housing vapor processing equipment.
VAPOR PROCESSING EQUIPMENT NOT WITHIN PROTECTIVE ENCLO- SURES (excluding piping and combustion devices)	2	The space within 18 inches in all directions of equipment containing flammable vapor or liquid extending to grade level. Up to 18 inches above grade level within 10 feet horizontally of the vapor processing equipment.
EQUIPMENT ENCLOSURES	1	Any area within the enclosure where vapor or liquid is present under normal operating conditions.
	2	The entire area within the enclosure other than Division 1
VACUUM ASSIST BLOWERS	2	The space within 18 inches in all directions extending to grade level. Up to 18 inches above grade level within 10 feet horizontally.

Ind 8.51 HEATING EQUIPMENT. The heating equipment and installation shall be in accordance with chs. Ind 50-64, Wis. Adm. Code.

Ind 8.515 [7-8.5] DRAINAGE AND WASTE DISPOSAL. (1) [7-8.5.1] Provision shall be made in the area where Class I liquids are dispensed to prevent spilled liquids from flowing into the interior of service station buildings. Such provision may be by grading driveways, raising doors sills or other equally effective means.

(2) [7-8.5.2] Crankcase drainings and liquids shall not be dumped into sewers, streams or adjoining property, but shall be stored in tanks or drums outside any building until removed from the premises.

Ind 8.52 [7-9] SOURCES OF IGNITION. (1) NO SMOKING. There shall be no smoking or open flames in the areas used for fueling, servicing fuel systems for internal combustion engines, or receiving or dispensing of flammable and combustible liquids.

(2) SIGNAGE. Conspicuous and legible signs reading "No Smoking - Stop Motor While Fueling" with letters not less than 2" high, shall be posted within sight of the customer being served.

(3) OPERATION OF MOTORS. The motors of all equipment being fueled shall be shut off during the fueling operation except for emergency generators, pumps, etc., where continuing operation is essential.

Ind 8.525 [7-10] FIRE CONTROL. Each service station shall be provided with at least one listed fire extinguisher having a minimum classification of 20 BC located so that an extinguisher will be within 50 feet of each pump, dispenser, underground fill pipe opening and lubrication or service room.

SELF-SERVICE STATIONS

Ind 8.53 [7-8.4] SELF-SERVICE STATIONS. (1) [7-8.4.2] DISPENSING DEVICES. Listed dispensing devices such as, but not limited to, coin-operated, key or card-operated and remote controlled types are permitted at self-service stations.

(2) [7-8.4.3] ATTENDANT. All self-service stations shall have at least one attendant on duty while the station is open to the public. The attendant's primary function shall be to supervise, observe and control the dispensing of Class I and Class II liquids while said liquids are actually being dispensed.

(3) [7-8.4.4] ATTENDANT RESPONSIBILITIES. It shall be the responsibility of the attendant to:

(a) Prevent the dispensing of Class I liquids into portable containers not in compliance with s. Ind 8.50;

(b) Control sources of ignition; and

(c) Immediately handle accidental spills and fire extinguishers if needed.

(4) [7-8.4.5] EMERGENCY CONTROLS. Clearly identified and readily accessible emergency controls shall be located within 15 feet of the attendant's control station.

(5) [7-8.4.6] OPERATING INSTRUCTIONS. Operating instructions shall be conspicuously posted in the dispensing area of each island.

(6) [7-8.4.7] LOCATION AND CONTROL OF DISPENSING AREA. The dispensing area shall at all times be in clear view of the attendant and the placing or allowing of any obstacle to come between the dispensing area and the attendant control area other than vehicles being fueled shall be prohibited.

(7) HOSE NOZZLE VALVES. Hose nozzle valves used at a self-service station for the dispensing of Class I liquids shall be listed automatic-closing types with or without a hold open device.

(8) [7-7.4.8] SIGNAGE. Conspicuous and legible signs reading "No Smoking - Stop Motor While Fueling" with letters not less than 2 inches high shall be posted within sight of the customer being served.

Note: See s. Ind 8.11(3)(c) for plan approval requirements.

MARINE SERVICE STATIONS

Ind 8.535 DISPENSING AREA AND EQUIPMENT. (1) DISPENSING AREA. The dispensing area shall be located from other structures so as to provide room for safe ingress and egress of craft to be fueled.

(2) DISPENSING UNITS. (a) Dispensing units shall in all cases be at least 20 feet from any activity involving fixed sources of ignition.

(b) Dispensing shall be by approved dispensing units with or without integral pumps and may be located on open piers, wharves or floating docks, or on shore or on piers of the solid-fill type.

(c) Dispensing nozzles shall be automatic closing without a hold open device.

(3) TANKS AND PUMPS. (a) Tanks and pumps not integral with the dispensing unit, shall be on shore or on a pier of the solid-fill type.

1. 'Exceptions.' a. The department may authorize the installation of tanks on a pier where shore location would require excessively long supply lines to dispensers, provided the installation complies with the spacing, diking, and piping requirements of this chapter and the quantity so stored does not exceed 1,100 gallons aggregate capacity.

b. Shore tanks supplying marine service stations may be located aboveground where rock ledges or high water table make underground tanks impractical. Such tanks shall be installed in accordance with the applicable requirements of this chapter.

(b) Where tanks are at an elevation which produces a gravity head on the dispensing unit, the tank outlet shall be equipped with a device, such as a solenoid valve, positioned adjacent to and downstream from the required valve, so installed and adjusted that liquid cannot flow by gravity from the tank in case of piping or hose failure when the dispenser is not in use.

(4) PIPING. Piping between shore tanks and dispensing units shall be in accordance with the applicable requirements of this chapter except that, where dispensing is from a floating structure, suitable lengths of oil resistant flexible hose may be employed between the shore piping and the piping on the floating structure as made necessary by change in water level or shoreline.

(a) [7-3.1.1] Piping handling Class I liquids shall be grounded to control stray currents.

(b) [7-3.1.2] Piping shall be located so as to be protected from physical damage.

(c) [7-3.1.3] A readily accessible valve to shut off the supply from shore shall be provided in each pipeline at or near the approach to the pier and at the shore end of each pipeline adjacent to the point where flexible hose is attached.

(d) [7-3.1.4] After completion of the installation, including any paving, that section of the pressure piping system between the pump discharge and the connection for the dispensing facility shall be tested for at least 30 minutes at the maximum operating pressure of the system.

Ind 8.54 FUELING OPERATIONS. (1) GENERAL. (a) No motor fuel or special fuel shall be dispensed directly from a storage tank without passing through an approved cabinet type dispenser.

(b) No motor fuel or special fuel shall be dispensed from a tank truck, contractor's tank or farm tank directly into the fuel tank of a motor vehicle.

(c) Fueling shall not be undertaken at night except under well lighted conditions.

(d) No person shall dispense fuel into a boat while any person in or upon such boat is smoking, while an open flame is present in or upon such boat, or while any motor of such boat is in operation.

(e) The following precautions shall be observed before opening tanks and during the entire fueling process:

1. All engines, motors, and fans except bilge exhaust fan, shall be shut down.

2. All open flames shall be extinguished.

3. All ports, windows, doors and hatches shall be closed.

(f) Tanks shall not be completely filled. A minimum of 2 percent of tank space, or 6 percent if the fuel being taken aboard is 32 degrees F. or below, shall be allowed for fuel expansion.

(g) The fuel delivery nozzle shall be put in contact with the fill pipe before the flow of fuel is commenced and this contact shall be continuously maintained until the flow has stopped.

(h) Spillage shall be immediately wiped up when it occurs.

(2) FUEL SYSTEMS WITH PORTABLE TANKS. (a) Tanks shall be removed from boats for fueling. Fueling of tanks shall be accomplished with tanks resting on a level surface.

(b) The vent and cap shall be tightly closed when transporting a portable tank containing fuel.

(c) The fuel delivery nozzle shall be put in contact with the fill pipe before the flow of fuel is commenced and this contact shall be continuously maintained until the flow has stopped.

(d) Tanks shall not be completely filled. A minimum of 2 percent of the tank space, or 6 percent if the fuel is 32 degrees F. or below, shall be allowed for fuel expansion.

Ind 8.545 FIRE EXTINGUISHERS. All marine service stations shall be provided with at least one fire extinguisher having a minimum 20 BC rating.

SUBCHAPTER 10
PROCESSING PLANTS

Ind 8.55 [8-1] SCOPE. This subchapter shall apply to those plants or buildings which contain chemical operations such as oxidation, reduction, halogenation, hydrogenation, alkylation, polymerization and other chemical processes but shall not apply to chemical plants, refineries or distilleries as defined, which are covered in subch. 11.

Ind 8.555 [8-2] LOCATION. (1) [8-2.1] APPLICATION. The location of each processing vessel shall be based upon its liquid capacity. Processing vessels shall be located, with respect to distances to lines of adjoining property which can be built upon, in accordance with Table 8.555-1, except when the processing plant is designed in accordance with sub. (2).

Table 8.555-1
Location of Processing Vessels from Property Lines

Processing Vessels with Emergency Relief Venting to Permit Pressure	Stable Liquids	Unstable Liquids
Not in excess of 2.5 psig	Table 8.19-6*	2-1/2 times Table 8.19-6*
Over 2.5 psig	1-1/2 times Table 8.19-6*	4 times Table 8.19-6*

*Double distances where protection of exposure is not provided.

(2) [8-2.1.1] EXCEPTION. The distances required in sub. (1) may be waived when the vessels are housed within a building and the exterior wall facing the line of adjoining property which can be built upon is a blank wall having a fire resistance rating of not less than 4 hours. When Class IA or unstable liquids are handled, the blank wall shall have explosion resistance in accordance with good engineering practice.

Ind 8.56 [8-3] PROCESSING BUILDING. (1) [8-3.1] CONSTRUCTION. (a) [8-3.1.1] Processing buildings shall be of fire-resistive or noncombustible construction, except heavy timber construction with load-bearing walls may be permitted for plants utilizing only stable Class II or Class III liquids. Except as provided in s. Ind 8.555 (2) in the case of explosion resistant walls used in conjunction with explosion relieving facilities, load-bearing walls shall be prohibited. Buildings handling Class I or Class II liquids shall be without basements or covered pits.

Note: Processing buildings are normally limited in height and area, depending upon the type of construction and private fire protection provided, to minimize the possibility of fire of such extent as to jeopardize public safety. Processing buildings with numerous accessible exterior openings offer favorable features for fire fighting. Provision for smoke and heat venting may be desirable to assist access for fire fighting.

(b) [8-3.1.2] Areas shall have adequate exit facilities arranged to prevent occupants from being trapped in the event of fire. Exits shall not be exposed by the drainage facilities described in sub. (2).

(2) [8-3.2] DRAINAGE. (a) [8-3.2.1] Emergency drainage systems shall be provided to direct flammable or combustible liquid leakage and fire protection water to a safe location. This may require curbs, scuppers, or special drainage systems to control the spread of fire.

(b) [8-3.2.2] Emergency drainage systems, if connected to public sewers or discharged into public waterways, shall be equipped with traps or separators.

(c) [8-3.2.3] The processing plant shall be designed and operated to prevent the normal discharge of flammable or combustible liquids to public waterways, public sewers or adjoining property.

(3) [8-3.3] VENTILATION. (a) [8-3.3.1] Enclosed processing buildings handling Class I or Class II liquids shall be ventilated at a rate of not less than one cubic foot per minute per square foot of solid floor area. This shall be accomplished by natural or mechanical ventilation with discharge or exhaust to a safe location outside of the building. Provision shall be made for introduction of make-up air in such a manner as not to short circuit the ventilation. Ventilation shall be arranged to include all floor areas or pits where flammable vapors may collect. Local or spot general ventilation may be needed for the control of special fire or health hazards. Such ventilation, if provided, can be utilized for up to 75 percent of the required ventilation.

(b) [8-3.3.2] Equipment used in a building and the ventilation of the building shall be designed so as to limit flammable vapor-air mixtures under normal operating conditions to the interior of equipment, and to not more than 5 feet from equipment which exposes Class I liquids to the air.

Note: Examples of such equipment are dispensing stations, open centrifuges, plate and frame filters, open vacuum filters and surfaces of open equipment.

(4) [8-3.4] EXPLOSION RELIEF. (a) [8-3.4.1] Areas where Class IA or unstable liquids are processed shall have explosion venting through one or more of the following methods:

1. Open air construction;
2. Lightweight walls and roof;
3. Lightweight wall panels and roof hatches; or
4. Windows of explosion venting type.

Ind 8.565 [8-4] LIQUID HANDLING. (1) [8-4.1] STORAGE. (a) [8-4.1.1] The storage of liquids in tanks shall be in accordance with the applicable provisions of subch. 4.

(b) [8-4.1.2] If the storage of liquids in outside aboveground or underground tanks is not practical because of temperature considerations or production considerations, tanks may be permitted inside of buildings or structures in accordance with the applicable provisions of subch. 4.

Note: Production considerations necessitating storage inside of buildings include but are not limited to high viscosity, purity, sterility, hygroscopicity, sensitivity to temperature change and need to store temporarily pending completion of sample analysis.

(c) [8-4.1.3] Storage tanks inside of buildings shall be permitted only in areas at or above grade which have adequate drainage and are separated from the processing area by construction having a fire resistance rating of at least 2 hours. Day tanks, running tanks and surge tanks are permitted in process areas. Openings to other rooms or buildings shall be provided with noncombustible liquid-tight raised sills or ramps at least 4 inches in height, or the floor in the storage area shall be at least 4 inches below the surrounding floor. As a minimum each opening shall be provided with a listed, self-closing 1-1/2 hour fire door pursuant to s. Ind 51.047, Wis. Adm. Code, or a listed fire damper pursuant to s. Ind 64.42, Wis. Adm. Code. The room shall be liquid-tight where the walls join the floor.

(d) [8-4.1.4] The storage of liquids in containers shall be in accordance with the applicable provisions of subch. 6.

(2) [8-4.2] PIPING, VALVES AND FITTINGS. (a) [8-4.2.1] Piping, valves and fittings shall be in accordance with subch. 5.

(b) [8-4.2.2] Listed flexible connectors may be used where vibration exists or where frequent movement is necessary. Approved hose may be used at transfer stations.

(c) [8-4.2.3] Piping containing liquids shall be identified as specified in s. Ind 8.435.

(3) [8-4.3] TRANSFER. (a) [8-4.3.1] The transfer of large quantities of liquids shall be through piping by means of pumps or water displacement. Except as required in process equipment, gravity flow shall not be used. The use of compressed air as a transferring medium shall be prohibited.

(b) [8-4.3.2] Positive displacement pumps shall be provided with pressure relief discharging back to the tank or to pump suction.

(4) [8-4.4] EQUIPMENT. (a) [8-4.4.1] Equipment shall be designed and arranged to prevent the unintentional escape of liquids and vapors and to minimize the quantity escaping in the event of accidental release.

(b) [8-4.4.2] Where the vapor space of equipment is usually within the flammable range, the probability of explosion damage to the equipment can be limited by inerting, by providing an explosion suppression system, or by designing the equipment to contain the peak explosion pressure which can be modified by explosion relief. Where the special hazards of operation, sources of ignition or exposures indicate a need, consideration shall be given to providing protection by one or more of the above means.

Ind 8.57 [8-5] TANK VEHICLE AND TANK CAR LOADING AND UNLOADING. Tank vehicle and tank car loading or unloading facilities shall be separated from aboveground tanks, warehouses, other plant buildings or nearest line of adjoining property which can be built upon by a distance of 25 feet for Class I liquids and 15 feet for Class II and Class III liquids measured from the nearest position of any fill stem. Buildings for pumps or shelters for personnel may be a part of the facility. Operations of the facility shall comply with the applicable provisions of s. Ind 8.41.

Ind 8.575 [8-6] FIRE CONTROL. (1) [8-6.1] FIRE EXTINGUISHERS. Listed portable fire extinguishers of appropriate size, type and number shall be provided.

(2) [8-6.2] SPECIAL HAZARDS. Where the special hazards of operation or exposure indicate a need, the following fire control provisions shall be provided.

(a) [8-6.2.1] A reliable water supply shall be available in pressure and quantity adequate to meet the probable fire demands.

(b) [8-6.2.2] Hydrants shall be provided in accordance with accepted good practice.

(c) [8-6.2.3] Hose connected to a source of water shall be installed so that all vessels, pumps, and other equipment containing flammable or combustible liquids can be reached with at least one hose stream. Nozzles that are capable of discharging a water spray shall be provided.

(d) [8-6.2.4] Processing plants shall be protected by an approved automatic sprinkler system or equivalent extinguishing system.

(e) [8-6.4] All plant fire protection facilities shall be adequately maintained and periodically inspected and tested to make sure they are always in satisfactory operating condition and they will serve their purpose in time of emergency.

(3) [8-6.3] NOTIFICATION SYSTEM. An approved means for prompt notification of fire to those within the plant and the public fire department available shall be provided. Where service is available, a public fire alarm box shall be located nearby if required by the department or authorized deputy.

Note: It may be advisable to connect the plant system with the public system.

Ind 8.58 [8-7] SOURCES OF IGNITION. (1) [8-7.1] GENERAL. (a) [8-7.1.1] Precautions shall be taken to prevent the ignition of flammable vapors. Sources of ignition include but are not limited to open flames; lightning; smoking; cutting and welding; hot surfaces; frictional heat; static, electrical and mechanical sparks; spontaneous ignition, including heat-producing chemical reactions; and radiant heat.

(b) [8-7.1.2] Class I, Class II or Class III liquids at a temperature above their flashpoints, shall not be dispensed into metal containers unless the nozzle or fill pipe is in electrical contact with the container. This can be accomplished by maintaining metallic contact during filling, by a bond wire between them, or by other conductive path having an electrical resistance not greater than 10^6 ohms. Bonding is not required where a container is filled through a closed system, or the container is made of glass or other nonconducting material.

(2) [8-7.2] MAINTENANCE AND REPAIR. (a) [8-7.2.1] When necessary to do maintenance work in a liquid processing area, the work shall be authorized by a responsible member of supervision.

(b) [8-7.2.2] Hot work, such as welding or cutting operations, use of spark-producing power tools, and chipping operations shall be permitted only under supervision of an individual in responsible charge. The individual in responsible charge shall make an inspection of the area to be sure that it is safe for the work to be done and that safe procedures will be followed for the work specified.

(3) [8-7.3] ELECTRICAL EQUIPMENT. (a) [8-7.3.1] This subsection shall apply to areas where Class I liquids are stored or handled or where Class II or Class III liquids are stored or handled at a temperature above their flash points. For areas where Class II or Class III liquids only are stored or handled at a temperature below their flash points, the electrical equipment may be installed in accordance with the provisions of ch. ILHR 16, Wis. Adm. Code, for ordinary locations; however, care shall be used in locating electrical apparatus to prevent hot metal from falling into open equipment.

(b) [8-7.3.2] All electrical equipment and wiring shall be of a type specified by and shall be installed in accordance with ch. ILHR 16, Wis. Adm. Code.

(c) [8-7.3.3] So far as it applies, par. (e) shall be used to delineate and classify areas for the purpose of installation of electrical equipment under normal circumstances. In the application of classified areas, a classified area shall not extend beyond an unpierced floor, wall, roof or other solid partition.

(d) [8-7.3.4] The area classifications listed in par. (e) are based on the premise that the installation meets the applicable requirements of this chapter in all respects. Should this not be the case, the authority having jurisdiction shall have the authority to classify the extent of the area.

(e) [8-7.3.5] Extent of classified areas shall be as follows:

Table 8.58-1

Location	National Electrical Code Class I Division	Extent of Classified Area
Indoors equipment installed in accordance with s. Ind 8.36 (5)(b) where flammable vapor-air mixtures may exist under normal operations.	1	Area within 5 feet of any edge of such equipment, extending in all directions.
	2	Area between 5 feet and 8 feet of any edge of such equipment, extending in all directions. Also, area up to 3 feet above floor or grade level within 5 feet to 25 feet horizontally from any edge of such equipment.*
Outdoor equipment of the type covered in s. Ind 8.36 (5) (b) where flammable vapor-air mixtures may exist under normal operations.	1	Area within 3 feet of any edge of such equipment, extending in all directions.
	2	Area between 3 feet and 8 feet of any edge of such equipment extending in all directions. Also, area up to 3 feet above floor or grade level within 3 feet to 10 feet horizontally from any edge of such equipment.
TANK - ABOVEGROUND**		
Shell, Ends, or Roof and Dike Area	2	Within 10 feet from shell, ends or roof of tank. Area inside dikes to level of top of dike.
	1	Within 5 feet of open end of vent, extending in all directions.
Vent	2	Area between 5 feet and 10 feet from open end of vent, extending in all directions.
	1	Area above the roof and within the shell.
DRUM AND CONTAINER FILLING		
Outdoors, or Indoors with Adequate Ventilation	1	Within 3 feet of vent and fill opening, extending in all directions.

Table 8.58-1 (Continued)

Location	National Electrical Code Class I Division	Extent of Classified Area
DRUM AND CONTAINER FILLING (continued)		
	2	Area between 3 feet and 5 feet from vent or fill opening, extending in all directions. Also up to 18 inches above floor or grade level within a horizontal radius of 10 feet from vent or fill opening.
PUMPS, BLEEDERS, WITHDRAWAL FITTINGS, METERS AND SIMILAR DEVICES		
Indoors	2	Within 5 feet of any edge of such devices, extending in all directions. Also up to 3 feet above floor or grade level within 25 feet horizontally from any edge of such devices.
Outdoors	2	Within 3 feet of any edge of such devices extending in all directions. Also up to 18 inches above grade level within 10 feet horizontally from any edge of such devices.
PITS		
Without Mechanical Ventilation	1	Entire area within pit if any part is within a Division 1 or 2 classified area.
With Mechanical Ventilation	2	Entire area within pit if any part is within a Division 1 or 2 classified area.
Containing Valves, Fittings or Piping, and Not Within a Division 1 or 2 Classified Area	2	Entire pit.
DRAINAGE DITCHES, SEPARATORS, IMPOUNDING BASINS		
	2	Area up to 18 inches above ditch, separator or basin. Also, up to 18 inches above grade within 15 feet horizontally from any edge.

* The release of Class I liquids may generate vapors to the extent that the entire building, and possibly a zone surrounding it, should be considered a Class I, Division 2 location.

**For Tanks - Underground, see s. Ind 8.505 of subch. 9.

(f) [8-7.3.6] Where the provisions of pars. (a) through (e) require the installation of electrical equipment suitable for Class I, Division 1 or Division 2 locations, ordinary electrical equipment including switchgear may be used if installed in a room or enclosure which is maintained under positive pressure with respect to the classified area. Ventilation make-up air shall not be contaminated by flammable vapors.

Ind 8.585 [8-8] HOUSEKEEPING. (1) [8-8.1] PREVENTION OF SPILLS. Maintenance and operating practices shall be in accordance with established procedures which will tend to control leakage and prevent the accidental escape of liquids. Spills shall be cleaned up promptly.

(2) [8-8.2] AISLES. Adequate aisles shall be maintained for unobstructed movement of personnel and so that fire protection equipment can be brought to bear on any part of the processing equipment.

(3) [8-8.3] COMBUSTIBLE MATERIALS. Combustible waste material and residues in a building or operating area shall be kept to a minimum, stored in closed metal waste cans, and disposed of daily.

(4) [8-8.4] GROUND AREA. Ground area around buildings and operating areas shall be kept free of tall grass, weeds, trash or other combustible materials.

SUBCHAPTER 11
REFINERIES, CHEMICAL PLANTS AND DISTILLERIES

Ind 8.59 [9-1] STORAGE. (1) [9-1.1] APPLICATION. Liquids shall be stored in tanks, in containers or in portable tanks. Tanks shall be installed in accordance with subch. 4.

(2) [9-1.2] LOCATION OF TANKS. Tanks for the storage of liquids in tank farms and in locations other than process areas shall be located in accordance with s. Ind 8.19 (2) and (3).

(3) [9-1.3] PIPING, VALVES AND FITTINGS. Piping systems shall be in accordance with subch. 5.

Ind 8.595 [9-2] WHARVES. Wharves handling flammable or combustible liquids shall be in accordance with s. Ind 8.44.

Ind 8.60 [9-3] LOCATION OF PROCESS UNITS. Process units shall be located so that they are accessible from at least one side for the purpose of fire control. Where topographical conditions are such that liquids can flow from a processing area so as to constitute a fire hazard to property of others, provision shall be made to divert or impound the flow by curbs, drains or other suitable means.

Ind 8.605 [9.4] FIRE CONTROL. (1) [9-4.1] SMOKING PROHIBITION. Smoking shall be permitted only in approved areas.

(2) [9-4.2] HAZARDOUS WORK. Hot work, such as welding or cutting operations, use of spark-producing power tools, and chipping operations shall be permitted only under supervision of an individual in responsible charge. The individual in responsible charge shall make an inspection of the area to be sure that it is safe for the work to be done and that safe procedures will be followed for the work specified.

(3) [9-4.3] MAINTENANCE AND OPERATING PRACTICES. Maintenance and operating practices shall be in accordance with established procedures which will tend to control leakage and prevent the accidental escape of flammable or combustible liquids. Spills shall be cleaned up promptly.

(4) [9-4.4] FIRE EXTINGUISHERS. Portable fire extinguishers and control equipment shall be provided in such quantities and types as are needed for the special hazards of operation and storage.

(5) [9-4.5] WATER EXTINGUISHING SYSTEMS. Water shall be available in volume and at adequate pressure to supply water hose streams, foam producing equipment, automatic sprinklers or water spray systems as the need is indicated by the special hazards of operation and storage.

(6) [9-4.6] SPECIAL EXTINGUISHING SYSTEMS. Special extinguishing equipment such as that utilizing foam, inert gas or dry chemical shall be provided as the need is indicated by the special hazards of operation and storage.

(7) [9-4.8] EMERGENCY CONTROL ORGANIZATION. An emergency control organization consistent with provided equipment and available personnel shall be established, and appropriate procedures specified, to cope with fire or other emergencies. Plant personnel assigned to the emergency control organization shall be trained in their duties.

(8) [9-4.9] FIRE ALARM. An approved means for prompt notification of fire to those within the plant and the public fire department available shall be provided.

SUBCHAPTER 12
OIL BURNING

Ind 8.61 USE OF APPROVED EQUIPMENT. (1) PUBLIC BUILDINGS AND PLACES OF EMPLOYMENT. Oil burning equipment installed in conjunction with public buildings and places of employment shall conform with the applicable requirements of ch. Ind 64, Wis. Adm. Code.

(2) ALL OTHER LOCATIONS. Oil burning equipment installed in all other locations shall be listed by Underwriters' Laboratories.

Ind 8.615 DESIGN AND CONSTRUCTION OF TANKS. (1) GENERAL. Tanks shall be of a shape or type consistent with sound engineering design.

(2) METAL TANK CONSTRUCTION. Metal tanks shall be welded, riveted and caulked, braced, or bolted, or constructed by use of a combination of these methods. Filler metal used in brazing shall be nonferrous metal or an alloy having a melting point above 1,000 degrees F. and below that of the metal joined.

(3) STANDARDS OF DESIGN. Tanks shall be used under atmospheric pressure and substantially shall be built in accordance with standards of design approved by the department.

(4) OPERATING PRESSURE. Approved tanks may be used for operating pressures not exceeding 1 psig and shall be limited to 2.5 psig under emergency venting conditions.

(5) STATIC HEAD. The tank shall be designed for the maximum static head which will be imposed when the vent or fill pipe is filled with oil. The maximum static head so imposed on approved tanks shall not exceed 10 psig at the bottom of the tank.

(6) PRESSURE TANKS. Pressure tanks shall conform to the applicable requirements of chs. Ind 41-42, Wis. Adm. Code.

Ind 8.62 INSTALLATION OF UNDERGROUND TANKS. (1) APPLICATION. Tanks to be buried underground shall be limited to pressure tanks as specified in s. Ind 8.615 (6).

(2) EXCAVATION AND LOCATION. (a) The distance from any part of a tank storing fuel oil to the nearest wall of any basement, pit or property line shall be not less than 1 foot.

(b) Underground tanks or tanks under buildings shall be so located with respect to existing building foundations and supports that the loads carried by the latter cannot be transmitted to the tank.

(c) Excavation for underground tanks shall be made with due care to avoid undermining of foundations of existing structures.

(3) FOUNDATION AND INSTALLATION. (a) An underground tank shall be set on a firm foundation and surrounded with at least 6 inches of noncorrosive inert materials such as clean sand, earth or pea gravel, well tamped in place.

(b) The tank shall be placed in the hole with care since dropping or rolling the tank into the hole can break a weld, puncture or damage the tank metal or scrape off the protective coating of coated tanks.

(c) A tank shall be covered with a minimum of 2 feet of earth, or shall be covered with not less than 1 foot of earth on top of which shall be placed a slab of reinforced concrete not less than 4 inches thick.

(d) When underground tanks are, or are likely to be subjected to traffic, they shall be protected against damage from vehicles passing over them by at least 3 feet of earth cover, or 18 inches of well-tamped earth, plus 6 inches of reinforced concrete or 8 inches of asphaltic concrete.

(e) When asphaltic or reinforced concrete paving is used as part of the protection, it shall extend at least 1 foot horizontally beyond the outline of the tank in all directions.

(4) CORROSION PROTECTION. Corrosion protection for the tank and its associated buried piping shall be provided by the use of protective coatings or wrappings, cathodic protection, or corrosion resistant materials of construction.

(5) VENTING. Underground tanks shall be equipped with an open vent or an automatically operated vent, arranged to discharge to the open air. Vent openings and vent pipes shall be of ample size to prevent abnormal pressure in the tank during filling, but not smaller than the pipe size specified in Table 8.62-1.

Table 8.62-1

Capacity of Tank U.S. Gallons	Approximate Imperial Gallons	Diameter of Vent, Iron Pipe Size
500 or less	500 or less	1-1/4 inches
501 to 3,000	501 to 2,500	1-1/2 inches
3,001 to 10,000	2,501 to 8,300	2 inches
10,001 to 20,000	8,301 to 16,600	2-1/2 inches
20,001 to 35,000	16,601 to 29,000	3 inches

Note: Where tanks are filled by the use of a pump through tight connections, a vent pipe not less in size than the discharge of the pump shall be used.

(6) CONNECTIONS. All connections to an underground tank shall be made through the top of the tank.

(a) Exception. Connections for centralized oil distribution systems as specified in s. Ind 8.685.

(7) GAUGING. An underground tank shall be provided with means for gauging.

Ind 8.625 INSTALLATION OF OIL SUPPLY TANKS INSIDE BUILDINGS. (1) ENCLOSED TANKS. Fuel oil storage tanks shall be isolated in accordance with the isolation of hazard requirements of ss. Ind 54.14, Ind 55.29, Ind 56.15, Ind 57.14, Ind 58.24, Ind 59.21, Ind 62.32 and Ind 62.46, Wis. Adm. Code, and with the requirements specified in s. Ind 8.63.

(2) UNENCLOSED TANKS. Unenclosed supply tanks inside of buildings shall conform to the following conditions:

(a) Supply tanks not larger than 10 gallons in capacity shall be specifically approved for the purpose.

1. 'Exception.' An approved safety can will be acceptable for a storage tank.

(b) Supply tanks having a capacity of 10 gallons or larger but not larger than 660 gallons shall comply with the provisions of subch. 4 and with the other applicable requirements of this chapter.

(3) SIZE AND LOCATION OF UNENCLOSED TANKS INSIDE BUILDINGS. The size and location of unenclosed tanks inside of any building conforming to the area limitations specified in ss. Ind 54.01, Ind 57.01, Ind 59.12 and Ind 62.24, Wis. Adm. Code, or inside portions of any building within the area limitations and separated by fire division walls, shall conform to the following conditions:

(a) Basement or Lowest Story. 1. A supply tank shall be not larger than 660 gallons.

2. Not more than one 660 gallon tank or 2 tanks of aggregate capacity of 660 gallons or less shall be connected to one oil burning appliance.

3. The aggregate capacity of all such tanks shall not exceed 1,320 gallons, unless a fire-resistive separation as specified in chs. Ind 50-64 -Building and Heating, Ventilating and Air Conditioning Code for each 660 gallons of tank capacity is provided.

(b) All Other Stories. 1. Not more than 6 portable supply tanks or not more than 6 safety cans may be located higher than the first story of a building. No such supply tank or safety can shall have an individual capacity exceeding 10 gallons.

2. The total quantity located higher than the first story shall not exceed 10 gallons.

3. An unenclosed supply tank not an integral part of an approved heater and not larger than 10 gallons shall be placed not less than 2 feet horizontally from any source of heat either in or external to the appliance being served but in any case shall be located so that the temperature of the oil in the tank shall not exceed 25 degrees F. above room temperature.

(4) CLEARANCES. An unenclosed supply tank larger than 10 gallons shall be placed not less than 5 feet from any fire or flame either in or external to any fuel-burning appliance, nor shall such a tank obstruct quick and safe access to any utility service meters, switch panels and shutoff valves.

(5) SUPPORTS. An unenclosed supply tank shall be securely supported by rigid noncombustible supports to prevent settling, sliding or lifting.'

(6) PITCH. When a supply tank larger than 10 gallons capacity is provided with an opening in the bottom for use as a burner supply connection or as a drain, the tank shall be pitched toward the opening with a slope of not less than 1/4 inch per foot of length.

(7) SHUTOFF VALVE. A shutoff valve shall be provided immediately adjacent to the burner supply connection at the bottom of a supply tank.

(8) VENT PIPE. A supply tank larger than 10 gallons capacity shall be provided with an open vent pipe not smaller than the pipe size specified in Table 8.62-1 and a fill pipe, both terminating outside the building.

(9) GAUGING DEVICE. A supply tank provided with fill and vent pipes shall be equipped with a gauging device.

(10) PLUG OR CAP. Any unused opening in a tank equipped with fill and vent pipes shall be closed vapor tight by a pipe plug or cap screwed up tightly.

(11) CROSS CONNECTION. Two supply tanks of not more than 660 gallon aggregate capacity may be cross-connected and provided with a single fill and a single vent pipe as shown in figures 8.625-1 through 8.625-3.

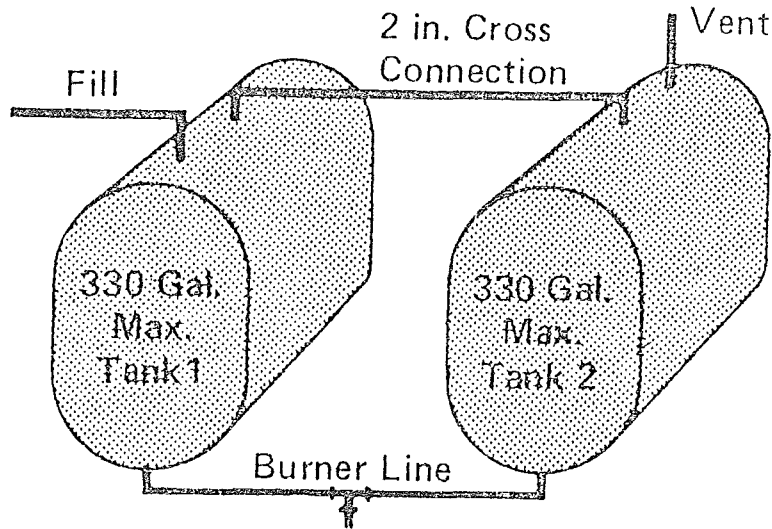


Figure 8.625-1

Arrangement of Two Fuel Oil Tanks of Not More Than 660 Gallons Aggregate Capacity

In this arrangement of 2 tanks only one fill pipe and one vent pipe are used. During filling oil enters tank No. 1. The displaced vapors pass through the cross connection at top into tank No. 2. The expansion zone for both tanks is obviously in tank No. 2 until the tanks equalize after filling is completed.

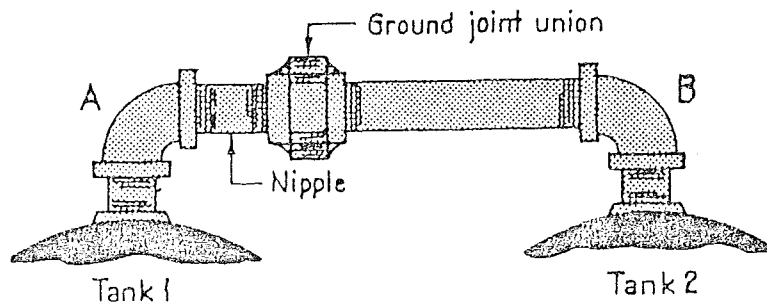
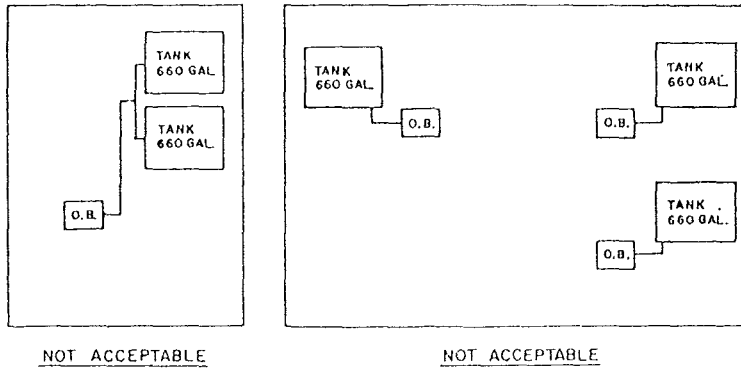
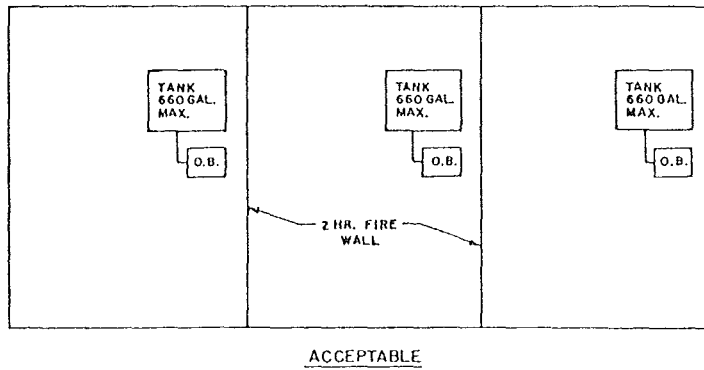
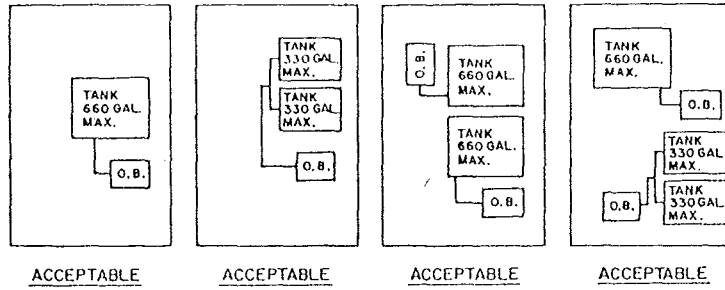


Figure 8.625-2

This shows the detail of the cross connection which can be used in Figure 8.625-1.



O.B. means one or more oil burners

Figure 8.625-3

Ind 8.63 INSTALLATION OF ENCLOSED SUPPLY TANKS INSIDE BUILDINGS. (1) INDIVIDUAL TANKS. A supply tank larger than 660 gallon capacity shall be enclosed when installed inside of a building.

(2) AGGREGATE TANKAGE. Tankage inside of a building in excess of that permitted for unenclosed tanks by s. Ind 8.625 (3) (a) shall be enclosed.

(3) CAPACITY LIMITATIONS. (a) The gross capacity of tanks in buildings of fire resistive types 1 or 2 construction shall not exceed 15,000 gallons.

(b) The gross capacity of tanks in buildings of other than fire resistive types 1 or 2 construction shall not exceed 10,000 gallons.

(c) The enclosure for tanks specified in pars. (a) and (b) shall include walls, a floor and a top and be formed from walls, partitions, floors or floor-ceiling assemblies having a fire resistance rating of not less than 3 hours with the walls bonded to the floor. If the walls of such enclosure extend to and are bonded to the underside of a concrete floor or roof which has a fire resistance rating of not less than 3 hours, a separate top is not required for the tank enclosure.

(4) TANK FOUNDATIONS. The tank shall be supported at least 4 inches above the floor by masonry saddles at least 12 inches thick, spaced not more than 8 feet on centers and extending the full width of the tank. At least 15 inches clearance shall be provided between the tank and the top and walls of the tank enclosure for the purpose of inspection and repair.

(5) TANK CONNECTIONS. All connections to an enclosed supply tank having a capacity of more than 660 gallons shall be made through the top of the tank, and the transfer of oil shall be by pump only and through continuous piping to and from the consuming appliances.

(6) VENTILATION. Provision shall be made for adequate ventilation of such enclosures prior to entering for inspection or repair of tanks.

(7) TANK VENTS. An enclosed supply tank shall be equipped with an open vent or an automatically operated vent, terminating outside the building. Vent openings and vent pipes shall be of ample size to prevent abnormal pressure in the tank during filling but not smaller than the pipe size specified in Table 8.62-1.

(8) GAUGING DEVICE. An enclosed supply tank shall be provided with a gauging device.

Ind 8.635 INSTALLATION OF OUTSIDE ABOVEGROUND TANKS NOT LARGER THAN 660 GALLONS. (1) APPLICATION AND LIMITATIONS. (a) Tankage not in excess of that permitted in s. Ind 8.625 (3) may be installed outside aboveground in a built-up area. The tanks may be adjacent to buildings, but the distance to adjoining property line shall comply with the requirements of Table 8.635-1.

Table 8.635-1
Fuel Oil (pressure 2.5 psig or less)

Type of Tank	Protection	Minimum Distance in Feet from Property Line Which is or Can be Built Upon, Including the Opposite Side of a Public Way and Shall be not Less than 5 Feet	Minimum Distance in Feet from Nearest Side of Any Public Way or from Nearest Important Building on the Same Property and Shall be Not Less than 5 Feet
Floating Roof	Protection for Exposures*	1/2 times diameter of tank	1/6 times diameter of tank
	None	Diameter of tank, but need not exceed 175 feet	1/6 times diameter of tank
Vertical with Weak Roof to Shell Seam	Approved foam or inerting system on tanks not exceeding 150 ft in diameter**	1/2 times diameter of tank	1/6 times diameter of tank
	Protection for Exposures*	Diameter of tank	1/3 times diameter of tank
	None	2 times diameter of tank, but need not exceed 350 feet	1/3 times diameter of tank
Horizontal and Vertical with Emergency Relief Venting to Limit Pressures to 2.5 psi	Approved inerting system on the tank or approved foam system on vertical tanks	1/2 times Table 8.635-2	1/2 times Table 8.635-2
	Protection for Exposures*	Table 8.635-2	Table 8.635-2
	None	2 times Table 8.635-2	Table 8.635-2

* Protection for Exposures shall mean fire protection for structures on property adjacent to liquid storage. Fire protection for such structures shall be acceptable when located within the jurisdiction of any public fire department, or adjacent to plants having private fire brigades capable of providing cooling water streams on structures on property adjacent to liquid storage.

** For tanks over 150 feet in diameter use, "Protection for Exposures" or "None" as applicable.

Table 8.635-2
Reference Table for Use with Table 8.635-1

Capacity Tank Gallons	Minimum Distance in Feet from Property Line Which is or Can be Built Upon, Including the Opposite Side of a Public Way	Minimum Distance in Feet from Nearest Side of Any Public Way or from Nearest Important Building on the Same Property
275 or less	5	5
276 to 750	10	5
751 to 12,000	15	5
12,001 to 30,000	20	5
30,001 to 50,000	30	10
50,001 to 100,000	50	15
100,001 to 500,000	80	25
500,001 to 1,000,000	100	35
1,000,001 to 2,000,000	135	45
2,000,001 to 3,000,000	165	55
3,000,001 or more	175	60

(b) Such tanks shall be protected from the weather and from physical damage incident to outside use.

(c) The tanks shall not block normal means of egress.

(2) CAPACITY LIMIT. Not more than one 660 gallon tank or 2 tanks of aggregate capacity of 660 gallons or less shall be connected to oil-burning appliances.

(3) MULTIPLE TANKS. Two supply tanks connected to the same burner as permitted by s. Ind 8.625 (11) may be cross connected but shall be located on a common slab and rigidly secured to each other.

(4) SUPPORTS. Tanks having a capacity of 660 gallons or less shall be securely supported by rigid noncombustible supports to prevent settling, sliding or lifting.

(5) SHUTOFF VALVE. A shutoff valve shall be provided in the burner supply line immediately adjacent to the gravity feed connection of a supply tank.

(6) VENTS. A tank not larger than 660 gallon capacity shall be equipped with an open vent not smaller than the pipe size specified in Table 8.62-1.

(7) GAUGING DEVICE. A tank shall be provided with a means to determine the liquid level. The test opening shall be closed tight, when not in use, and shall be designed to discourage tampering. Glass gauges or gauges which will permit the escape of oil from the tank when broken, shall be prohibited.

(8) FILL OPENING. The fill opening shall be of such size and so located as to permit ready filling in a manner which will avoid spillage.

Ind 8.64 INSTALLATION OF OUTSIDE ABOVEGROUND TANKS LARGER THAN 660 GALLONS. Outside aboveground tanks larger than 660 gallons shall comply with the requirements of s. Ind 8.615 (6).

Ind 8.645 FILL AND RETURN PIPING. (1) FILL PIPE LOCATION. (a) A fill pipe shall terminate outside of a building at a point at least 2 feet from any building opening at the same or lower level.

(b) A fill pipe shall terminate in a manner designed to minimize spilling when the filling hose is disconnected.

(c) Fill opening shall be equipped with a tight metal cover designed to discourage tampering.

(2) RETURN LINE LOCATION. A return line from a burner or pump to a supply tank shall enter the top of the tank. If the top of the supply tank is located above the level of the burner or piping, the return line shall extend in the tank not more than one inch.

(3) CROSS CONNECTIONS. Cross connections, except between 2 supply tanks not exceeding 660 gallon aggregate capacity, permitting gravity flow from one tank to another shall be prohibited.

(4) AUXILIARY TANKS. (a) An auxiliary tank shall be filled by a pump transferring the oil through continuous piping from the supply tank.

(b) An auxiliary tank shall be located at a level above the top of the supply tank from which it is filled.

(c) An auxiliary tank shall be provided with an overflow pipe draining to the supply tank and extending into the top of the supply tank not more than one inch. This requirement does not apply to an auxiliary tank specifically listed for use without an overflow pipe.

(d) An overflow pipe from an auxiliary tank and a return line from a burner or pump shall have no valves or obstructions.

Ind 8.65 SUPPLY PIPING. (1) LOCATION OF CONNECTIONS. (a) All piping, except the burner supply line from a tank having a capacity not over 660 gallons and the cross connection between 2 tanks having an aggregate capacity of 660 gallons or less, shall be connected into the top of a supply tank. When 2 tanks are cross connected, the tops of the tanks shall be on the same horizontal plane.

(b) The burner supply connection to a tank having a capacity of more than 660 gallons or to 2 or more tanks having an aggregate capacity of more than 660 gallons shall be connected into the top of each tank, except as permitted by sub. (5) or s. Ind 8.69 (5).

(2) USE OF TRANSFER PUMP. A transfer pump or an automatic pump may be used to deliver oil from a supply tank to a burner or to an auxiliary tank. Except as permitted by sub. (5) and s. Ind 8.685 a transfer pump shall not be connected to a tank having a capacity over 660 gallons or to 2 tanks having an aggregate capacity of over 660 gallons.

(3) INLET PRESSURE. The pressure at the oil supply inlet to an appliance shall be not greater than 3 psig unless the appliance is provided for a higher inlet pressure.

(4) PITCH OF PIPING. Where supply tanks are set below the level of the burner, the oil piping shall be so laid as to pitch toward the supply tank without traps.

(5) COMMERCIAL AND INDUSTRIAL INSTALLATIONS. The oil supply from tanks of any capacity permitted by this subchapter for commercial and industrial installations may be in accordance with the following:

(a) The burner supply line may be connected to an outside aboveground supply tank at a point below the liquid level, but each such connection shall be provided with an internal or external shutoff valve located as close as practicable to the shell of the tank. External valves and their connections to the tank shall be of steel.

(b) A transfer pump may be used.

Ind 8.655 OIL PUMPS AND VALVES. (1) TYPE OF PUMP. (a) An oil pump not a part of a listed burner shall be a positive displacement type which automatically shuts off the oil supply when stopped.

(b) An automatic pump not an integral part of a burner shall be a listed type installed in full compliance with its listing.

(2) SHUTOFF VALVE. (a) A readily accessible manual shutoff valve shall be installed at each point where required to properly control the flow of fuel in normal operation and where required to avoid oil spillage during servicing.

(b) The valve shall be installed to close against the supply.

(3) PRESSURE RELIEF VALVE. (a) Where a shutoff is installed in the discharge line of an oil pump not an integral part of a burner, a pressure relief valve shall be connected into the discharge line between the pump and the shutoff valve and arranged to return surplus oil to the supply tank or to bypass it around the pump unless the pump includes an internal bypass.

(b) Any fuel oil line incorporating a heater shall be provided with a relief valve arranged to discharge to the return line when any valve, pump, or other device may prevent the release of excessive pressure because of the expansion of the oil when heated.

(4) CONSTANT LEVEL VALVE. (a) Where oil is supplied to a burner requiring uniform flow by gravity feed and a constant level valve is not incorporated in the burner assembly or the oil is not supplied by an automatic pump, a constant level valve shall be installed in the supply line at the gravity tank or as close thereto as practicable, to insure uniform delivery of oil to the burner.

(b) The vent opening of such constant level valve shall be connected by piping or tubing to the outside of the building, unless the constant level valve is provided with an anti-flooding device.

(c) Vent piping or tubing of constant level valves shall not be connected to tanks or tank vents.

(5) VENTILATION. Provision shall be made for ventilation of enclosures, such as vaults or pits, where pumps and accessories are installed prior to entering for inspection or repair.

Ind 8.66 PIPING MATERIALS AND DESIGN. (1) PIPING. All piping shall be wrought iron, steel or brass pipe, or brass or copper tubing. Listed flexible metal hose may be used to reduce the effect of jarring and vibration or where rigid connections are impracticable and shall be installed in full compliance with its listing.

(a) Exception. Piping may be of other materials if used underground. Such piping shall be designed to specifications embodying principles recognized as good engineering design for the material used and shall be approved by the department.

(2) PIPING SIZE. (a) Piping used in the installation of oil burners and appliances other than conversion range oil burners shall be not smaller than 3/8-inch iron pipe size or 3/8-OD tubing except that 1/4-inch pipe or 5/16-OD tubing may be used in the suction line of systems where the top of the tank is below the level of the oil pump.

(b) Copper tubing shall have 0.035-inch nominal and 0.032-inch minimum wall thicknesses.

(3) PIPING CONNECTIONS. (a) Pipe shall be connected with standard fittings and tubing with fittings of listed type.

(b) Pipe connectors made of combustible materials or depending upon the frictional characteristics of combustible materials shall not be used inside of buildings or aboveground outside of buildings.

(c) If used below ground outside of buildings, connectors shall be of listed type and installed in accordance with their listing.

(d) All threaded joints and connections shall be made tight with suitable lubricant or pipe compound.

(e) Unions requiring gaskets or packings, right or left couplings, and sweat fittings employing solder having a melting point of less than 1,000° F. shall not be used in oil lines.

(f) Cast iron fittings shall not be used.

(4) PIPING SUPPORT AND PROTECTION. Piping shall be substantially supported and protected against physical damage and, where necessary, protected against corrosion. All buried piping shall be protected against corrosion.

(5) MOVEMENT. (a) Proper allowance shall be made for expansion, contraction, jarring and vibration.

(b) Pipe lines, other than tubing, connected to underground tanks, except straight fill lines and test wells, shall be provided with double swing joints, flexible connectors or otherwise arranged to permit the tanks to settle without impairing the tightness of the pipe connections.

Ind 8.665 VENT PIPING. (1) LOCATION. (a) Vent pipes shall be so laid as to drain toward one tank without sags or traps in which liquid can collect.

(b) Vent pipes shall be located so that they will not be subjected to physical damage aboveground.

(2) CONNECTIONS. (a) Vent pipes from tanks may be connected into one outlet pipe.

(b) The outlet pipe shall at least be one pipe size larger than the largest individual vent pipe connected thereto.

(c) In no case shall the point of connection between 2 or more vent pipes be lower than the top of any fill pipe opening.

(d) The lower end of a vent pipe shall enter the tank through the top and shall extend into the tank not more than one inch.

(3) TERMINATION. (a) Vent pipes shall terminate outside of buildings at a point not less than 2 feet measured vertically or horizontally from any building opening.

(b) Outer ends of vent pipes shall terminate in a weather-proof vent cap or fitting or be provided with a weather-proof hood.

(c) All vent caps shall have a minimum free open area equal to the cross-sectional area of the vent pipe and shall not employ screens finer than 4 mesh.

(d) Vent pipes shall terminate sufficiently above the ground to avoid being obstructed with snow and ice.

(e) Vent pipes from tanks containing heaters shall be extended to a location where oil vapors discharging from the vent will be readily diffused.

(f) If the static head with a vent pipe filled with oil exceeds 10 psig, the tank shall be designed for the maximum static head which will be imposed.

(4) CROSS CONNECTION. Vent pipes shall not be cross connected with fill pipes, return lines from burners or overflow lines from auxiliary tanks.

Ind 8.67 PRESSURE TANK FEED. Air or other gases shall not be used to pressurize tanks.

Ind 8.675 OIL GAUGING. (1) APPLICATION. All tanks in which a constant oil level is not maintained by an automatic pump shall be equipped with a method of determining the oil level.

(2) LOCATION OF TEST WELLS. Test wells shall not be installed inside buildings. For outside service they shall be equipped with a tight metal cover designed to discourage tampering.

(3) PREVENTION OF LEAK. (a) Gauging devices such as liquid level indicators or signals shall be designed and installed so that oil or vapor will not be discharged into a building from the fuel supply system. Inside tanks provided with fill and vent pipes used for No. 1 or No. 2 fuel oil shall be provided with a device to indicate either visually or audibly at the fill point when the oil in the tank has reached a predetermined safe level.

(b) No tank used in connection with any oil burner shall be equipped with a glass gauge or any gauge which, when broken, will permit the escape of oil from the tank.

Ind 8.68 INSIDE HEATING OIL TANKS TAKEN OUT OF SERVICE. At the time the inside heating oil tank is removed or taken out of service, the fill and vent pipe shall be removed from the exterior of the building.

Ind 8.685 CENTRALIZED OIL DISTRIBUTION SYSTEMS. (1) APPLICATION. Centralized oil distribution systems shall conform to the requirements of this section and to all other applicable requirements of this chapter. Oil may be fed from the supply tank or tanks by gravity or by transfer pump. All distribution piping outside of diked areas shall be underground. Plans showing the relative location of tanks, pumps, valves, piping and structure to be supplied by the system shall be approved by and filed with the authority having jurisdiction.

(2) TANK DESIGN. (a) Atmospheric tanks located entirely aboveground shall be built in accordance with the requirement for aboveground tanks specified in s. Ind 8.19. Atmospheric tanks located underground or partially underground shall be built in accordance with the requirements for underground tanks specified in s. Ind 8.21.

(b) Aboveground and partially buried tanks shall be diked in accordance with s. Ind 8.19 (4) (c) except that the volumetric capacity of the diked area shall be not less than the total volume above the adjacent grade level of all tanks within the diked area.

(3) TANK CAPACITY. The capacity of a single tank or the aggregate capacity of 2 or more tanks supplying a centralized oil distribution system shall be not more than 20,000 gallons except that underground tanks installed in accordance with the requirements for underground tanks specified in s. Ind 8.21 may be of any capacity permitted by this code.

(4) CONNECTIONS. (a) A distribution main may be connected to a tank or tanks having aggregate capacity of not more than 20,000 gallons at a point below the liquid level.

(b) When the distribution main is so connected, a readily accessible internal or external shutoff valve shall be installed in the main as close as practical to the tank.

(c) If external and aboveground, the shutoff valve and its tank connections shall be made of steel.

(d) Connections between the tank and the distribution main shall be made with double swing joints, flexible connectors or otherwise arranged to permit the tank to settle without damaging the system.

(e) Such connections when aboveground shall be located within the diked area.

(5) SAFETY CONTROLS. Only appliances equipped with primary safety controls specifically listed for the appliance shall be connected to a centralized oil distribution system.

(6) SHUTOFF VALVES. (a) A readily accessible manual shutoff valve shall be installed in each branch line which enters a building, mobile home, travel trailer, or other structure. This valve may be either inside or outside of such structure. If outside, the valve shall be protected from weather and damage. If inside, the valve shall be located directly adjacent to the point at which the supply line enters the structure.

(b) A device shall be provided which will automatically shut off the oil supply at or ahead of the point where it enters the interior of the structure, if the supply line between this device and the appliance is broken. This device shall be located on the appliance side of the manual shutoff valve required in par. (a). This device shall be solidly supported and protected from damage.

(7) OIL PRESSURE LIMIT. Means shall be provided to limit the oil pressure at the appliance inlet to a maximum of 3 psig. If a pressure reducing valve is to be used, it shall be a type approved for the service.

(8) MANUAL-RESET DEVICE. A manual-reset device shall be provided to shut off automatically the oil supply to the appliance if the oil pressure at the appliance inlet exceeds 8 psig.

(a) Exception. A shutoff device is not required when:

1. The distribution system is supplied from a gravity tank in which the maximum level of oil (hydrostatic head) is such that the pressure in the system at the appliance inlet cannot exceed 3 psig, or

2. The pressure-limiting device provided in accordance with sub. (7) is such that if the device fails to regulate the pressure to not more than 3 psig, the oil supply automatically will be shut off.

(9) RECORD KEEPING. Accurate inventory records shall be maintained and reconciled on all storage tanks for possible indication of leaking from tanks or piping.

Ind 8.69 OIL DISTRIBUTION SYSTEMS FOR ROOF-MOUNTED OR CEILING-SUSPENDED OIL-FIRED UNITS. (1) APPLICATION. Oil distribution systems for roof-mounted or ceiling-suspended oil-fired units shall conform to the requirements of this section and to all other applicable provisions of this chapter. Oil may be fed directly to the burner, directly from a tank or by means of a fuel distribution system which includes a transfer pump. Plans showing the relative location of tanks, pumps, valves, piping and their relationship to the structure supplied by the systems shall be approved by and filed with the authority having jurisdiction.

(2) OPERATING PRESSURE. When fed directly from a storage tank, the fuel supply system shall be designed so that under normal operating conditions the burner fuel unit operates with less than 10 inches Mercury (Hg) vacuum at the inlet.

(a) Exception. If the limitations are exceeded, a fuel supply system incorporating a transfer pump is needed and shall be provided.

(3) FUEL SUPPLY SYSTEM. The fuel supply system shall conform to the following general requirements:

(a) All components, such as but not limited to pumps, reservoirs, valves, regulators, relief valves and controls shall be listed for use with fuel oil.

(b) Control or relief provisions or both shall be provided to preclude pressurizing the main distribution lines 50 percent above the working pressure.

(c) No dead-ended main distribution oil lines shall be permitted unless provisions are made for air purging. These purge points shall be closed by plugs or caps when not actually in use.

(d) Means shall be provided to limit the oil pressure at the burner inlet to a maximum of 3 psig. If a pressure reducing valve is to be used, it shall be a type approved for the service.

(4) CAPACITY. The capacity of a single tank or the aggregate capacity of 2 or more tanks supplying a distribution system for roof-mounted or ceiling-suspended oil-fired units shall not be more than 20,000 gallons except that underground tanks installed in accordance with s. Ind 8.62 may be of any capacity permitted by this subchapter.

(5) AUXILIARY TANKS. If required by design, individual supply tanks (auxiliary or day tanks) connected to burners shall comply with the provisions of ss. Ind 8.625 (3) (b) and Ind 8.645 (4) (b), (c) and (d).

(6) VALVES AND DRIP TRAYS. Valves and drip trays for roof-mounted units only shall be provided to prevent oil spillage during service.

(7) SHUTOFF VALVES. (a) A readily accessible and identified manual shut-off valve shall be installed in each branch line which serves an individual burner and in the oil distribution line.

(b) This valve may be either inside or outside of a protective enclosure.

(c) If outside, the valve shall be protected from weather and damage.

(d) If inside, the valve shall be located directly adjacent to the point at which the supply line enters the protective enclosure.

(8) LISTED EQUIPMENT. Only appliances equipped with primary safety controls specifically listed for the appliance shall be connected to a distribution system for roof-mounted or ceiling-suspended oil-fired units.

(9) SWITCHING. (a) A switch in the electrical supply to the transfer pump shall be provided. Such switch, which is capable of being locked in the open position, shall be at a convenient location so the fuel supply system can be shut down for maintenance.

(b) Provisions shall be made so that shutdown of the fuel supply system shall interrupt the electrical supply to the units.

Ind 8.695 TESTS OF PIPING. (1) APPLICATION. After installation and before being covered, piping shall be tested for leaks.

(2) TEST CONDITIONS AND PROCEDURES. (a) Piping shall be tested hydrostatically, or with equivalent air pressure, at not less than 1-1/2 times the maximum working pressure but not less than 5 psig at the highest point of the system.

(b) The test shall be made so as not to impose a pressure of more than 10 psig on the tank.

(c) This test shall be maintained for at least 30 minutes or for sufficient time to complete visual inspection of all joints and connections.

(3) OTHER TESTS. (a) Instead of a pressure test, suction lines may be tested under a vacuum of not less than 20 inches of Mercury (Hg) maintained for at least 30 minutes.

(b) When the vertical length of the fill and vent pipes is such that when filled with liquid the static head imposed exceeds 10 psig, the piping shall be tested hydrostatically to a pressure equal to the static head thus imposed.

SUBCHAPTER 13 FARMS AND CONSTRUCTION PROJECTS

Ind 8.70 SCOPE. (1) FARMS. The provisions of this subchapter shall apply to the storage and handling on farms of flammable and combustible liquids having a flash point below 200 degrees F.

(2) CONSTRUCTION PROJECTS. The provisions of this subchapter also shall apply to the storage and handling of flammable and combustible liquids at road construction sites, earth moving projects, gravel pits and borrow pits, or wherever it is customary to obtain fuels in bulk and dispense or transfer them under control of the owner or contractor and where isolation from other structures make it unnecessary to require compliance with the more rigid standards of this chapter.

(3) EXCEPTIONS. The provisions of this subchapter shall not apply to the storage, handling and use of fuel oil tanks and containers connected with oil burning equipment.

Ind 8.705 TYPES OF APPROVED STORAGE. (1) GENERAL. Storage of flammable and combustible liquids on farms and at construction projects for private use shall be permitted as follows:

(a) In aboveground or underground tanks in accordance with subch. 4 and with the applicable provisions of this subchapter.

(b) In containers of 60 gallons or less capacity each, in accordance with the provisions of s. Ind 8.71.

(c) In tanks of 61 to 1,100 gallons capacity each, in accordance with the provisions of s. Ind 8.715.

(d) Tanks located on farms exceeding 1,100 gallons individual capacity shall comply with the provisions of s. Ind 8.345.

(e) Aboveground tanks in excess of 1,100 gallons individual capacity shall be prohibited on construction sites.

(2) FILL OPENING. A fill opening shall be provided and shall be equipped with a closure designed so that it may be locked.

(3) VENT OPENING. The tank shall be vented to prevent development of pressure or vacuum, as a result of filling or emptying the tank or from atmospheric temperature changes, from exceeding the design pressure of the tank.

(4) TANK LOCATION. Aboveground tanks shall be kept outside and at least 40 feet from any building, other combustion structure, haystack or similar hazard and shall be so located or such additional distance from buildings shall be maintained to insure that any vehicle, equipment or vessel being filled directly from such tank will be at least 40 feet from any building.

(5) TYPE OF TANKS. Tanks shall be of one of the following types:

(a) TANKS WITH TOP OPENINGS ONLY. Tanks designed with all openings in the top of the tank shall be mounted and equipped as follows:

1. Stationary tanks shall be mounted on timbers or blocks approximately 6 inches in height in a stable position.

2. Portable tanks equipped with attached metal legs resting on shoes or runners shall conform with the following:

a. The shoes or runners shall be spaced at least one tank diameter apart so the tank is supported in a stable position.

b. The shoes or runners shall be designed to rest upon the ground and so that the entire tank and its supports may be moved as a unit.

3. Tanks shall be equipped with a tightly and permanently attached approved pumping device having an approved hose of sufficient length for filling vehicles, equipment or vessels to be served from the tank.

a. Either the pump or the hose shall be padlocked to its hanger when not in use.

b. An effective anti-siphoning device shall be included in the pump discharge.

c. Siphons or internal pressure discharge devices are prohibited.

(b) Tanks Elevated for Gravity Discharge. Tanks may be provided with an opening in the bottom or the end of the tank for gravity dispensing of flammable liquids. Gravity type tanks shall be mounted and equipped as follows:

1. Supports to elevate the tank for gravity discharges shall be of wood or steel and shall be of proper design and strength to provide stability.

a. Exception. The tank may be placed on a pile of earth or near the edge of a cut bank to provide the necessary elevation, and may be supported on timbers or blocks to provide stability.

2. Bottom opening for gravity discharge shall be equipped with an internal valve that will close automatically in the event of fire through the operation of an effective heat actuated releasing device, and shall be supplemented by a second valve that can be operated manually.

3. The gravity discharge outlet shall be provided with an approved hose equipped with a self-closing valve at the discharge end, of a type that can be padlocked to its hanger to prevent tampering.

Ind 8.71 INDIVIDUAL CONTAINERS OF 60 GALLONS OR LESS CAPACITY EACH. (1) CONTAINER CONSTRUCTION. Containers shall be closed metal drums.

(2) INTERCONNECTION PROHIBITED. Individual containers shall not be interconnected.

(3) PUMPING DEVICES. Pumping devices or faucets used for dispensing flammable and combustible liquids shall be maintained to prevent leakage.

(4) PRESSURE DISCHARGE DEVICES. Discharge devices requiring pressure on the container are prohibited.

(5) STORAGE AND LOCATION OF INDIVIDUAL CONTAINERS OF 60 GALLONS OR LESS CAPACITY. Containers shall be stored as follows:

(a) Outside and at least 40 feet from any building, other combustible structures, haystack or similar hazard.

(b) Inside a building located at least 40 feet from any other building and used exclusively for the storage of flammable and combustible liquids.

(6) BUILDINGS USED FOR STORAGE OF FLAMMABLE AND COMBUSTIBLE LIQUIDS. Buildings used for storage of flammable and combustible liquids shall be provided with cross-ventilation with at least 2 vents of 64 square inches in area each, placed at floor level.

Ind 8.715 TANKS OF 61 to 1100 GALLONS CAPACITY EACH. (1) TANK CONSTRUCTION. (a) Tank material shall conform to the requirements of Table 8.715-1.

Table 8.715-1

Capacity - Gallons	Minimum Thickness of Steel Mfrs. Std. Gauge No.
61 - 560	14
561 - 1100	12

(b) Tanks shall be of single compartment design constructed in accordance with accepted engineering practice.

(c) Joints shall be riveted and caulked, riveted and welded, or welded.

(d) Tank heads over 6 feet in diameter shall be dished, stayed, braced or reinforced.

Ind 8.72 ABOVEGROUND TANKS ON FARMS EXCEEDING 1100 GALLONS INDIVIDUAL CAPACITY. Aboveground tanks exceeding 1100 gallons individual capacity located on farms shall comply with the provisions of s. Ind 8.19 and with the applicable provisions of this subchapter for aboveground tank installation, except a minimum distance of 100 feet shall be maintained from buildings, other combustible structures, hay stacks and similar hazards.

Ind 8.725 MARKING OF TANKS AND CONTAINERS. (1) GENERAL. (a) Containers for the storage of flammable liquids shall be conspicuously marked with the name of the product contained.

(b) Tanks of 1100 gallon individual capacity or less shall bear the words "FLAMMABLE - KEEP FIRE AWAY" and the additional marking "KEEP 40 FEET FROM BUILDINGS". All required lettering shall be at least one inch in height.

(c) Tanks and containers of 275 gallons or less capacity for the storage of flammable liquids with flash points less than 100 degrees F. shall be painted a bright red.

SUBCHAPTER 14 DIPPING AND COATING PROCESSES

Note: See ss. Ind 8.004 and Ind 8.008 for the adoption by reference with amendments of the National Fire Protection Association Standard NFPA No. 34-1979 - Standard for Dipping and Coating Processes using Flammable and Combustible Liquids.

SUBCHAPTER 15 ORGANIC COATINGS

Note: See ss. Ind 8.004 and Ind 8.009 for the adoption by reference with amendments of the National Fire Protection Association Standard NFPA No. 35-1976 - Standard for the Manufacture of Organic Coatings.

SUBCHAPTER 16 TANK VEHICLES FOR FLAMMABLE AND COMBUSTIBLE LIQUIDS

Note: See ss. Ind 8.004 and Ind 8.10 for the adoption by reference with amendments of the National Fire Protection Association Standard NFPA No. 385-1979 - Standard for Tank Vehicles for Flammable and Combustible Liquids.

SUBCHAPTER 17 LABORATORIES USING CHEMICALS

Note: See ss. Ind 8.004 and Ind 8.105 for the adoption by reference with amendments of the National Fire Protection Association Standard NFPA No. 45-1975 - Standard on Fire Protection for Laboratories Using Chemicals.

APPENDIX

The material contained in this appendix is for clarification only. The notes, illustrations, forms, etc., are numbered to correspond to the number of the rule as it appears in the text of the chapter.

A 8.006 Nonadopted Standard

The following standards are not incorporated by reference into this chapter; however, they do contain information which may be of use in answering questions concerning flammable and combustible liquids.

ANSI References

- B31 American National Standard Code for Pressure Piping
- B31.3 Petroleum Refinery Piping
- B31.4 Liquid Petroleum Transportation Piping Systems

A.P.I. References

- 620 Recommended Rules for the Design and Construction of Large, Welded, Low pressure Storage Tanks, plus Appendix - Fifth Edition 1973
- 650 Specifications for Welded Steel Tanks for Oil Storage, plus Appendix Fifth Edition - 1973
- 2000 Venting Atmospheric and Low Pressure Storage Tanks - 1973
- 12B Specifications for Bolted Production Tanks - Eleventh Edition May 1958 and Supplement I, April 1962
- 12D Specifications for Large Welded Production Tanks, Seventh Edition August 1957 and Supplement I, March 1965
- 12F Specifications for Small Welded Production Tanks, Sixth Edition March 1968

ASTM References

- A-395-74 Ferritic Ductile Iron Pressure Retaining Castings for Use at Elevated Temperatures

NFPA References

- 11 Standard for Foam Extinguishing Systems
- 11A Standard for High Expansion Foam Systems
- 12 Standard on Carbon Dioxide Extinguishing Systems
- 12A Standard on Halogenated Fire Extinguishing Agent Systems - Halon 1301
- 13 Standard for the Installation of Sprinkler Systems
- 14 Standard for the Installation of Standpipe and Hose Systems
- 15 Standard for Water Spray Fixed Systems for Fire Protection

- 17 Standard for Dry Chemical Extinguishing Systems
- 24 Standard for Outside Protection
- 27 Recommendations for the Organization, Training and Equipment of Private Fire Brigades
- 33 Standard for Stray Finishing
- 36 Standard for Solvent EXtraction Plants
- 49 Hazardous Chemicals Data
- 51 Standard for the Installation and Operation of Oxygen-Fuel Gas Systems for Welding and Cutting
- 68 Guide for Explosion Venting
- 69 Standard on Explosion Prevention Systems
- 71 Standard for the Installation Maintenance and Use of Central Systems for Guard, Fire Alarm and Supervisory Service
- 72A Standard for the Installation Maintenance and Use of Local Protective Signaling Systems for Watchman, Fire Alarm and Supervisory Service
- 72B Standard for the Installation and Use of Auxiliary Protective Signaling Systems for Fire Alarm Service
- 72C Standard for the Installation Maintenance and Use of Remote Station protective Signaling Systems
- 72D Standard for the Installation Maintenance and Use of Proprietary Protective Signaling Systems for Watchman, Fire Alarm and Supervisory Service
- 73 Standard for the Installation Maintenance and Use of Municipal Fire Alarm Systems
- 77 Recommended Practice on Static Electricity
- 78 Lightning Protection Code
- 86A Standard for Ovens and Furnaces
- 87 Standard for the Construction and Protection of Piers and Wharves

- 90A Standard for the Installation of Air Conditioning and Ventilating Systems
- 91 Standard for the Installation of Blower and Exhaust Systems for Dust, Stock and Vapor Removal or Conveying
- 204 Guide for Smoke and Heat Ventilating
- 231 Indoor General Storage
- 231C Rack Storage of Materials
- 327 Standard Procedures for the Standard for Cleaning or Safeguarding Small Tanks and Containers
- 386 Standard for Portable Shipping Tanks
- 407 Aircraft Fueling Servicing
- 496 Standard for Purged Enclosures for Electrical Equipment in Hazardous Locations
- 505 Standard for Powered Industrial Trucks
- 704 Identification of the Fire Hazards of Materials

Underwriters' Laboratories, Inc. References

Standard for Steel Aboveground Tanks for Flammable and Combustible Liquids, UL 142-1972

Standard for Steel Underground Tanks for Flammable and Combustible Liquids, UL 58-1971

Standard for Steel Inside Tanks for Oil Burner Fuel, UL 80-1974

A 8.11 (6) FORMS. The following form (SBD-9) is referred to in this section. Copies of this form are available from the Division of Safety and Buildings, P.O. Box 7969, Madison, Wisconsin 53707.

A 8.125 (2) FORMS. The following form (SBD-6294) is referred to in this section. Copies of this form are available from the Division of Safety and Buildings, P.O. Box 7969, Madison, Wisconsin 53707.

A 8.14 FORMS. The following forms (SB-8 and SB-8A) are referred to in this section. Copies of these forms are available from the Division of Safety and Buildings, P.O. Box 7969, Madison, Wisconsin 53707.

APPLICATION FOR INSTALLATION OF
BULK STORAGE
FLAMMABLE LIQUID/LIQUID PETROLEUM/NATURAL GAS
TANKS

Application is hereby made to the Department of Industry, Labor and Human Relations for Permission to (install) a (remodel) _____ in accordance with the following detailed statement and attached plans subject to the orders of the Department of Industry, Labor and Human Relations. The installation, in all other respects, will comply with applicable provisions of Chapter IND 8 and 9 of the Wisconsin Administrative Code, (FLAMMABLE AND COMBUSTIBLE LIQUIDS/LP GAS CODE).

NOTE: Plans must include (1). location of property lines; (2). buildings; (3). tanks (4). load and unload racks; (5). streets and highways; (6). streams and other bodies of water within 150 feet of tanks. Plans should be drawn in triplicate to scale and the scale indicated on the drawings.

TANK LOCATION (STREET):	CITY:	COUNTY:	OWNER:	STREET:	CITY:
NAME OF BULK PLANT OR SERVICE STATION:				STREET:	CITY:

LIST TANK SPECIFICATIONS:

NO.:	TYPE:	LENGTH:	DIA.	CAPACITY:	CONTENTS:
	<input type="checkbox"/> HORZ <input type="checkbox"/> VERT. <input type="checkbox"/> UNDRGRND				
	<input type="checkbox"/> HORZ <input type="checkbox"/> VERT. <input type="checkbox"/> UNDRGRND				
	<input type="checkbox"/> HORZ <input type="checkbox"/> VERT. <input type="checkbox"/> UNDRGRND				

ARE TANKS UNDERWRITER APPROVED? <input type="checkbox"/> YES <input type="checkbox"/> NO	ARE TANKS NEW? <input type="checkbox"/> YES <input type="checkbox"/> NO	IF THE ANSWER TO EITHER OF THE TWO PREVIOUS QUESTIONS IS NO, STATE GAGE NUMBER OF NOMINAL THICKNESS:
--	---	--

VERTICLE TANKS – LIST THICKNESS OF METAL:

BOTTOM:	TOP:	SHELL – LOWER COURSE:	REMAINDER:	BOTTOM:	TOP:	SHELL – LOWER COURSE:	REMAINDER:

ABOVE GROUND TANKS – VENTS AND VALVES – SECTION IND 8.21(4) (5) (9)

REGULAR VENT PRESSURE/VACUUM	MAKE:	NUMBER:	SIZE:
EMERGENCY RELIEF VENT	MAKE:	NUMBER:	SIZE:
EMERGENCY INTERNAL VENT	MAKE:	NUMBER:	SIZE:

DESCRIBE SUPPORTS/FOUNDATION – SECTION IND 8.20(4):	SPECIFY DISTANCE BETWEEN TANKS SECTION IND 8.21(4) (5) (9):
---	---

UNDERGROUND TANKS:

DESCRIBE DISTANCE BURIED: SECTION IND 8.22(2)	SIZE OF FILL PIPE:	SIZE AND HEIGHT OF VENT: X
---	--------------------	----------------------------

IS PUMP MOTOR EXPLOSION PROOF? <input type="checkbox"/> YES <input type="checkbox"/> NO	ARE PUMP SWITCHES EXPLOSION PROOF? <input type="checkbox"/> YES <input type="checkbox"/> NO	ARE BONDS AND GROUNDING PROVIDED AT LOAD/UNLOAD RACKS? <input type="checkbox"/> YES <input type="checkbox"/> NO
---	---	---

IND 69.10 STORAGE TANKS: FLAMMABLE AND COMBUSTIBLE LIQUIDS, LIQUEFIED PETROLEUM GAS, AND LIQUEFIED NATURAL GAS.

(1) A fee shall be assessed and collected for the review and approval of plans according to the following table:

(a) 8.12 (1) (a) STORAGE TANKS, EACH LOCATION

- FLAMMABLE AND COMBUSTIBLE LIQUIDS
TANK CAPACITY 8,000–100,000 GALLONS..... \$20.00 PER TANK
- TANK CAPACITY OVER 100,000 GALLONS ... \$45.00 PER TANK
 - Liquefied petroleum gas and liquefied natural gas \$30.00 PER TANK
 - Revisions to previously approved plans..... \$15.00 revised plan

(2) An inspection fee of \$30.00 for each tank at bulk plants, service stations or other locations shall be remitted at the time the plans are submitted.

APPROVAL	NO.	COST	TOTAL
UNDER 100,000	X	\$20.00 =	
OVER 100,000	X	\$45.00 =	
LP GAS LN GAS	X	\$30.00 =	
REVISION	X	\$15.00 =	
INSPECT. FEE	X	\$30.00 =	
			TOTAL FEE \$

SIGNATURE:	MAILING ADDRESS:	DATE:	TELEPHONE: ()
------------	------------------	-------	----------------

Date: _____
 Name: _____
 Address: _____
 Owner or Operator's Name: _____

DRAFT
COPY FOR YOUR
INFORMATION

Number	Size of Tanks	Contents of Tank

Complied Not Complied

PLAN APPROVAL AND LOCATION

- Plans have been submitted and approval obtained before installation. (Tanks 5000 gallons or larger individual capacity-approval by state). (Tanks under 5000 gallons individual capacity-approval by chief of local fire department).
- Tanks located a minimum of 1 foot to basement and 3 feet from property line that can be built upon.

TANK CONSTRUCTION

- Tanks are new and carry a UL label.
- Tanks do not have a UL label, owner has certified statement that tanks are constructed in accordance with UL specifications.
- Tanks are used, but have been tested and certified to be of sound construction.

(Fiberglass tanks are required to have UL label).

CORROSION PROTECTION

- Steel tanks have been coated for corrosion protection and all scrapes and scratches have been recoated.

DEPTH AND COVER

- Tank location subjected to traffic and will have 3 feet of earth cover or 18 inches of earth plus 6 inches reinforced concrete or 8 inches asphalt.
- Tank location not subjected to traffic and will have a minimum of 2 feet of earth or 1 foot earth plus 4 inches reinforced concrete.

BACK FILL

- Back fill will be clean sand or pea gravel well-tamped in place. For

SWING JOINTS

-

VENTING

-

Signature
 white copy to owner
 1-1-1988

Name of Owner	Building Occupancy or Use	Agent, Architect or Engineering Firm
Company	Tenant Name, if any	Street & No.
Street & No.	Building Location, Street & No.	City State & Zip
City State & Zip	City County	Phone

1. Rule Ind. _____ of the Wisconsin Administrative code cannot be entirely satisfied because:

2. In lieu of complying exactly with the rule, the following alternative is proposed as a means of providing an equivalent degree of safety:

3. Supporting arguments are:

Verification by owner

_____, being duly sworn, says he is the petitioner herein, thus he has read the foregoing petition and that the same is true, as he verily believes.

 signature of owner

subscribed and sworn to me this ____ day of _____, 19____, in _____ County, Wisconsin.

 Notary Public

My commission expires: _____

Commission Action	
Secretary	Date

-PETITION IS VALID ONLY IF NOTARIZED
 Petition Fee: \$200.00. see Ind. 69 09(7) 1980 code

POSITION STATEMENT:

To be compiled by
 Chief of Fire Department
 SB 8-A (2-77)

**WISCONSIN DEPARTMENT OF
 INDUSTRY, LABOR AND HUMAN RELATIONS
 DIVISION OF SAFETY & BUILDINGS
 P.O. BOX 7969 MADISON WI 53707**

Name of Owner	Building Occupancy or Use	Agent, Architect or Engineering Firm	
Company	Tenant Name, if any	Street & No.	
Street & No.	Building Location, Street & No.	City	State & Zip
City	State & Zip	City	County
Phone			
1. I have read the petition for modification of rule: Ind			
2. I recommend (Check appropriate box)	Denial	Approval	Conditional Approval
No Comment*			
3. Explanation for Recommendation:			
* If desired, Fire Departments may indicate "No Comment" on non-fire safety issues such as sanitary, energy conservation, structural, barrier free environments, etc.			
4. <input type="checkbox"/> I find no conflict with local rules and regulations			
<input type="checkbox"/> I find that the petition is in conflict with local rules and regulations			
Explanation			
Signature of Fire Chief			Date

PLEASE COMPLETE AND SUBMIT PROMPTLY TO DEPARTMENT OF INDUSTRY, LABOR AND HUMAN RELATIONS AT THE ADDRESS SHOWN ABOVE.

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EFFECTIVE DATE OF RULES

Pursuant to s. 227.026 (1) (Intro), Stats., s. Ind 8.435 will take effect 180 days following publication in the Wisconsin Administrative Register and the remaining sections will take effect on the first day of the month following publication in the Wisconsin Administrative Register.
