Indian and Northern Affairs   Affaires indiennes et du Nord

BAND COUNCIL RESOLUTION
RÉSOLUTION DE CONSEIL DE BANDE

981/21-77-31

File Reference – Nº de réf. du dossier

976/3-10

NOTE: The words "From our Band Funds" "Capital" or "Revenue", which ever is the case, must appear in all resolutions requesting expenditures from Band Funds

NOTA: Les mots "des fonds de notre bande "Capital" ou revenu" selon le cas doivent paraitre dans toutes les résolutions portant sur des dépenses à même les fonds des bandes

THE COUNCIL OF THE / *LE CONSEIL DE LA BANDE INDIENNE*	Kamloops Indian Band	Current Capital Balance / *Solde de capital*	$
AGENCY / DISTRICT	Thompson River	Committed – *Engagé*	$
PROVINCE	British Columbia	Current Revenue balance / *Solde de revenu*	$
PLACE / *NOM DE L'ENDROIT*	Kamloops	Committed – *Engagé*	$
DATE	10th (DAY – *JOUR*) January (MONTH – *MOIS*) AD 19 78 (YEAR – *ANNÉE*)		

DO HEREBY RESOLVE:
DÉCIDE, PAR LES PRESENTES:

AND AGREE that there is a definite need for a By-Law for the prevention of fires, the spread of fire, and the preservation of life, with respect to buildings and persons upon the Reserve.

BE IT THEREFORE KNOWN that the Council of the Kamloops Indian Band does hereby adopt, as of this date, the attached By-Law, being Appendix A, for such purposes and in accordance with Sections 81, Subsection 8, Subsection c, Subsection q, of the Indian Act.

A quorum for this Bande
Pour cette bande le quorum est
consists of
fixé à 3.
Council Members
Membres du Conseil

Manuel Leonard
(Chief – *Chef*)

(Councillor – *conseiller*) Richard Seymour (Councillor – *conseiller*) (Councillor – *conseiller*)

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FOR DEPARTMENTAL USE ONLY – *RÉSERVÉ AU MINISTERE*

1. Band Fund Code / *Code du compte de bande*	2. COMPUTER BALANCES – *SOLDES D'ORDINATEUR* A. Capital	B. Revenue – *Revenu*	3. Expenditure / *Dépenses*	4. Authority – *Autorité* Indian Act Sec / *Art. de la Loi sur les Indiens*	5. Source of Funds / *Source des fonds*
	$	$	$		☐ Capital ☐ Revenue / *Revenu*

6. Recommended – *Recommendable*

Date   Recommending Officer – *Recommandé par*

Approved – *Approuvable*

Date   Approving Officer – *Approuvé par*

IA 135 (7-73) 7530-21-023-4662

THE KAMLOOPS BAND OF INDIANS

BY-LAW #1977 - 1

SOR/78-150
eff Feb 20, 1978

Being a By-Law for the Prevention of Fires, the Spread of Fire, and for the Preservation of Life and property.

The Council of the Kamloops Band of Indians, pursuant to Section 81 of the Indian Act, enacts as a By-Law thereof as follows:

1. THIS By-Law may be cited as the Kamloops Indian Band Fire Prevention By-Law.

2. IN this By-Law
   (a) "Band" means the Kamloops Band of Indians;
   (b) "Band Council" means the Council of the Kamloops Band of Indians;
   (c) "reserve" means the Kamloops Indian Reserves Nos. 1, 2, 3, 4, and 5.
   (d) "authority having jurisdiction" shall mean the Kamloops Indian Band Fire prevention officer.
   (e) "fire prevention officer" shall mean the person or persons appointed from time to time by the Kamloops Indian Band Council to carry out the duties and responsibilities under this By-Law.

3. BAND may appoint, from time to time, a Fire Prevention Officer and deputies and assistants as it seems fit, for the purpose of enforcing and carrying out the duties and responsibilities as set out within the various Codes and Acts as detailed herein, and as herein adopted as part and parcel of this By-Law.

4. THERE is hereby incorporated as part and parcel of this By-Law, which will set out the corporate rules and regulations as contained therein; the National Building Code of Canada 1977, and any amendments as may be acclaimed from time to time, as issued by the associate committee on the National Building Code, National Research Council of Canada. The National Building Code (NBC) establishes the standard of fire safety for the construction of new buildings, the reconstruction of buildings including extensions or alterations, buildings involving a change of occupancy and upgrading of buildings to remove an unacceptable fire hazard.

5. THERE is hereby incorporated as part and parcel of this By-Law, which will set out the corporate rules and regulations as contained therein; the National Fire Code of Canada 1975, and any amendments as may be acclaimed from time to time as issued by the associate committee on the National Fire Code, National Research Council of Canada. The National Fire Code (NFC) establishes the standard for fire prevention, fire fighting and life safety in buildings in use, including standards for the conduct of activities causing fire hazards, maintenance of fire safety equipment and egress facilities, standards for portable extinguishers, limitations on building contents and the establishment of fire safety plans including the organization of supervisory staff for emergency purposes. In addition, the NFC establishes the standard for prevention, containment and fighting of fires originating outside buildings which may present a hazard to a community and sets standards for the transportation of flammable and combustible liquids.

6. THERE is incorporated as part and parcel of this By-Law; the Fire Marshall's Act, being chapter 148 of the Revised Statutes of British Columbia, all amendments thereto, and regulations thereunder. The intent is that those standards, rules, regulations, and practices as set out in the Fire Marshall's Act, shall be adopted as part and parcel of this By-Law and shall be enforced in the normal way by the Kamloops Indian Band fire prevention officer as herein created and defined.

7. ENFORCEMENT

A. Inspection

(1) An inspector shall, for the purpose of carrying out an inspection, at reasonable times, have free access and right of entry to any building or any part of a building whether completed or under construction, or to any property

(a) in or upon which it is known or suspected that explosive or flammable substances or materials are manufactured, transported, handled, stored, used, sold, or otherwise disposed of, or

(b) which the inspector believes may not (i) be designed or constructed so as to prevent fire or the spread of fire,

(ii) have or provide for fire escapes and other exit facilities adequate for escape in the event of fire or the alarm of fire, or

(c) which the inspector believes may be designed or constructed so as to contain hazards to life or safety, or

(d) in which the inspector believes hazards to life or safety to be present.

(e) no person, save and except Firemen or Police, shall enter a building or buildings endangered by fire, or enter within the lines designated by ropes or guards, across any or all streets, lanes, or alleys, at or near such buildings.

continued...

(e) Any person refusing to move from the lines designated by ropes or guards when directed to do so by a Police Officer or Fire Department Officer is guilty of an offence under this By-Law. This section shall not apply to the owners, occupiers of buildings endangered by fire, or their employees, provided that such persons shall have obtained the consent and permission of Chief of the Fire Department to enter such buildings, or come within the line designated by ropes or guards.

(2) The owner, occupier, or lessee of a building or property or any other person having knowledge of the building or property shall, upon request, give to an inspector who is carrying out an inspection of the building or property under this Code such assistance as he may require in carrying out the inspection.

(3) Every person who is required by article 7.(2) to give information or assistance to an inspector and who

(a) does not give the information or assistance which he is required to give, or

(b) knowlingly states anything false in any information delivered or furnished to the inspector, and every person who obstructs or interferes with an inspector who is carrying out an inspection under this Code is guilty of an offence and liable on summary conviction to a penalty not exceeding $200.00.

B. Orders

(1) If an inspector finds that any provision of this Code has been contravened or has not been complied with or has been complied with improperly or only in part or that conditions exist in or upon a building or property to which this Code applies which, in his opinion, constitute a fire hazard or otherwise constitute a hazard to life or property or both he may make such order to ensure

continued...

full and proper compliance with this Code and in particular, but without limiting the generality of the foregoing, he may

(a) make to the owner, occupier or lessee of the building or property such recommendations as he deems necessary to correct the contravention or to ensure compliance with this Code or to remove the hazards referred to in this Code, or

(b) make such orders as he deems necessary with respect to any of the matters referred to in this Code.

(2) All house-piping, appliances, and vents within the scope of the Act shall be for new installations such as are sanctioned by these regulations; existing installations, if found unsafe or are to be replaced, shall be replaced with equipment sanctioned by these regulations.

(3) The Inspector may require that work shall be done in conformity with higher standards than specified in these regulations if, at his descretion, he deems that such higher standards are reasonably necessary in the interest of safety.

(4) The Inspector may after the examination of any work issue a Rejection Card which shall have the same force and effect as an order issued under this section.

(5) An order made under this Code shall be in writing and may be directed to the owner, occupier, or lessee of the building or property in respect of which the order is made or to both.

(6) An order made under this Code shall be served by

(a) Delivering it or causing it to be delivered to the person to whom it is directed, or by

(b) posting a copy of it in a conspicuous place on the building or property if the person to whom it is directed cannot be found, is not known or refuses to accept services of the order.

continued...

(7) Where an order has been posted in accordance with the foregoing, no person other than the Inspector or someone designated by and acting for the Inspector shall remove, deface or destroy said order, or Rejection Card.

C. Appeals

(1) Any person against whom an order has been made under this Code may, before the expiration of 10 (ten) days after the order was made, appeal to the Provincial Fire Marshall who shall review and shall amend, revoke, or confirm the order appealed against or substitute another order which the inspector could have made for the order appealed against.

(2) Where an order has been reviewed under C.(1), any person who is interested in the order and is dissatisfied with the review or refusal to review may, within thirty days after the decision has been made known appeal to a Judge of the County Court for the County of Yale to review the order or the decision of the Provincial Fire Marshall.

3 An appeal under article C.(2) shall be by motion, notice of which shall be served on the respondent in the appeal by the appellant and the parties shall furnish the court with copies of all proceedings, reports, orders and other documents relating to the order under review.

4 (1) A person appealing under article C.(2) shall within one week after serving notice of motion under article C.(3) or within such extended time as the Judge may allow

(a) file with the court a bond of an amount not less than $50.00 or such greater amount to be fixed by a Judge, with one or more sureties approved by the Judge conditioned to pay all of the costs of the appeal if judgment is given against him, or

(b) deposit with the court an amount not less than $100.00 or such greater amount to be fixed by a Judge to cover the costs of the appeal.

(5) (i) The Judge may, upon hearing the appeal, make an order to

(a) affirm, modify or revoke the order appealed against, or

(b) require an inspector to enquire further into the facts or circumstances of the case and report to the Judge who shall issue a final order in accordance with clause (a).

(6) The Judge may make such an order for costs as seems just to him.

(7) An order made by a Judge on appeal to him may be enforced in the same manner as an order of the court.

(8) Notwithstanding any other provision of this Code where any person has appealed an order under this Code the time prescribed for compliance with that order shall be extended until the appeal has been finally disposed of and no work shall proceed on the building or other property in respect of which the order was made until the appeal has been finally disposed of.

D. Penalties

(1) Every person who contravenes or fails to comply with this By-Law or who fails to carry out an Order made under this By-Law or any condition attached to a permit or to which a permit is subject is guilty of an offence and where no other penalty is provided under this By-Law, is liable on summary conviction to a fine of not less than $25.00 and not more than $500.00 or to imprisonment for a term not exceeding six months or to both such fine and imprisonment and in default of payment of the fine to imprisonment for an additional term not exceeding six months.

(2) Where a person fails or refuses to carry out an order made under this Code or acts contrary to such an order or fails or refuses to comply with any condition attached to a permit or to which a permit is subject, the Fire Inspector may apply to the County Court for the County of Yale or to a Judge thereof and on hearing the application the court or Judge thereof may grant an injunction to restrain that person from proceeding with the work in respect of which the order was made or the permit was issued and the court or Judge may make such further order as the court or Judge deems fit.

8. BURNING

A. Except as hereinafter provided, no person shall light, ignite or start, or allow, or cause to be lighted, ignited or started a fire of any kind whatsoever in the open air.

B. (1) The Fire Inspector may issue a special permit for open air burning of brush, grass, weeds and like materials resulting from the cleaning of lots.

(2) No person to whom a special permit has been issued under this clause shall, on or in any fire, burn any rubber tires, oil, tar, asphalt shingles, battery boxes, plastic material, or any similar materials which produce heavy black smoke.

(3) Every person to whom a special permit has been issued under this clause shall place and keep a competent person at all times in charge of such fire while the same is burning or smouldering and until such fire is completely extinguished and shall provide that person with efficient appliances and equipment in order to prevent the fire from getting beyond control or causing damage or becoming dangerous to life and property.

(4) The Fire Inspector may refuse to issue a special permit whenever burning, having regard to all the prevailing circumstances, would likely be hazardous or create a nuisance.

C. (1) Without a special permit being secured, dry garden refuse only may be burned in the open air in small fires in Spring and Fall, on specification by the Fire Prevention Office.

(2) Every person who starts a fire on said days shall place and keep a competent person at all times in charge of such fire while the same is burning or smouldering and until such fire is completely extinguished and shall provide that person with efficient applicances and equipment in order to prevent the fire from getting beyond control or causing damage or becoming dangerous to life or property.

D. This regulation does not apply to:

(a) Small confined fires used for cooking food in grills and barbeques.

(b) Necessary Municipal burning, and

(c) Open air burning for fire training exercises.

E. A portable incinerator or other portable device or appliance for burning garbage, rubbish or other waste material shall mot be erected or used nor shall any enclosed fire be built, set or maintained outside the walls of a building without a permit from the Fire Inspector.

F. An appliance or device referred to in sentence E shall be equipped with proper spark-arresting attachments and such other safeguards, if any, as shall be prescribed by the Fire Inspector.

G. Inside incinerators situated within Hotels shall be equipped with gas-fired jet to eliminate excessive soot, fumes and odor, and shall be equipped with such safeguards as shall be prescribed by the Fire Inspector.

9. FEES - The fees hereinafter specified shall be paid to the Band by all applicants for any permit required by this By-Law, or under the Code adopted by this By-Law, or by the regulations passed pursuant to the provisions of the Fire Marshall Act and for the inspection of any work or thing for which the said permit is required:

A. For any installation of gasoline tanks, oil tanks, diesel tanks and pumps.

B. Installation and inspection of compressed gas tanks for domestic or commercial use.

C. Installation and inspection of compressed gas applicances or systems for domestic use, or for re-inspection, or changes in the system.

D. Inspection and installation of domestic and commercial oil burners, including wall and floor furnaces and including tanks.

E. Installation and inspection of bulk propane, bulk gasoline, or bulk oil storage tanks for storage or other purpose built above ground.

For all the above there shall be a standard fee of $5.00.

10. FLAMMABLE LIQUIDS

Those portions of City of Kamloops Fire Prevention By-Law 10-1, dealing with flammable liquids, and which generally includes Clause 2.1.6, Flammable Liquids; 2.1.6.1 to 2.1.6.11 (85) respectively, as well as Amendment 10-13, Clause 2.1.6.5, are hereby incorporated and form part of this By-Law as they exist presently and as amended from time to time.

Approved and passed at a duly convened meeting of the Council of the Kamloops Band of Indians this 10th day of ~~December~~ January, 1977.

Mary Leonard
Chief

Richard Seymour
Councillor

Joe Camille
Councillor

Clarence T. Jules
Councillor

2.1.6. FLAMMABLE LIQUIDS

SCOPE

2.1.6.1.(1) This subsection shall apply to the storage, handling and use of flammable liquids as heretofore defined, except that it shall not apply to the transportation of flammable liquids when in conformity with the applicable provincial regulations, or with the regulations of the Board of Transport Commissioners for Canada, or regulations lawfully on file with and approved by the Board of Transport Commissioners for Canada. Application

(2) Flammable liquids of Class B that are heated to temperatures equal to or higher than their flash points shall be subject to the applicable requirements for Class A flammable liquids. Heated Class B flammable liquids

(3) The provisions of these regulations shall also apply to high flash point liquids (above 200°F) when heated, even though these same liquids would be outside of its scope when they are not heated. High flash point liquids

(4) The storage and handling of liquefied petroleum gases shall be in accordance with provincial regulations.

2.1.6.2. Containers, tanks, equipment and apparatus that have been investigated by and meet the listing requirements of a nationally recognized testing laboratory and are so marked shall be considered as meeting the requirements of this Code. Acceptability of containers tanks and equipment

2.1.6.3. (1) The flash point of flammable liquids having a flash point below 175°F shall be determined in accordance with a standard method of test for flash point.

(2) Fuel oils and gas oils shall be determined in accordance with a standard method of test for flash point.

(3) The flash point of flammable liquids having a flash point of 175°F or higher shall be determined in accordance with a standard method of test for flash point.

2.1.6.4.(1) All flammable liquids, flammable liquid compounds or flammable liquid mixtures offered for sale at retail in containers except as indicated in sentences (2) and (3) shall be conspicuously marked or labelled in easily legible type, which is in contrast to any other printed matter on the label. Warning labels

(2) The warning herein required may be incorporated with similar warnings of other hazards inherent in the product or may be printed on a separate label.

(3) Nothing herein contained shall apply, however, to beverages, articles of food or drugs.

(4) Such markings are also not required when the container bears labels as to hazard in accordance with the requirements of the Board of Transport Commissioners for Canada.

(5) For flammable liquids a label similar to the following shall be used:

WARNING! FLAMMABLE Keep Away from Heat, Sparks and Open Flame Keep Closed When Not in Use

2.1.6.5.(1) Signs indicating the presence of flammable liquids particularly those of Class A shall be conspicuously posted Signs be poste
(a) on storage cabinets for flammable liquids, and
(b) outside of storage rooms for flammable liquids, and
(c) in the immediate area of large storage and distributing installations for flammable liquids when required by the authority having jurisdiction.

STORAGE OF LESS THAN FIFTY GALLONS

2.1.6.6.(1) Where the quantity of flammable liquid being stored, handled or used requires a permit as described in subsection 1.4.2. the operation shall be considered hazardous and should take place in a separate building, but where this is not practicable such rooms may be adjacent to other rooms if they are separated by a 2-hr fire separation and do not exceed 3000 sq ft in area.

(2) Where the quantity of Class A flammable liquids exceeds 5 gal in a work area it shall be stored in a metal storage cabinet that is located
(a) only in an area where flammable liquids are required for normal operations,
(b) not less than 5 ft from combustible materials and 10 ft from heating equipment or hazardous processes likely to cause ignition.

(c) Unless it is approved by the Fire Chief, no person shall put, place, pour or deliver, into any container having a capacity of less than five gallons, any Class One (1) or Class Two (2) inflammable liquid.

(3) Storage cabinets for flammable liquids shall be constructed or have an equivalent form of construction approved by the authority having jurisdiction so that
(a) the bottom, top, door and sides are at least No. 18 United States Standard Metal Gauge sheet iron and double walled with a 1 1/2" air space,
(b) the joints are made tight by rivets or welds,
(c) the door sill is raised at least 2 in. above the bottom of the cabinet,
(d) the cabinet door is secured with a 3-point lock, and
(e) the cabinet is vented by means of 2 openings, one near the top of one side and the other near the bottom of the opposite side, that are at least 2 in. in diameter and can be quickly sealed.

(4) A portable extinguisher having at least a 20-B classification shall be provided near the entrance to a room where a cabinet containing flammable liquids is located. Fire protection equipment

DRUM AND CONTAINER STORAGE AND DISPENSING

2.1.6.7.(1) This article shall apply only to storage and dispensing procedures where the quantity exceeds 50 gal and no individual container has a capacity in excess of 50 gal. Storage in separate or attached buildings

(2) Wherever practicable there shall be a separate building for flammable liquid storage and dispensing whose construction meets the requirements of the building bylaw.

(3) A building where flammable liquids are stored and dispensed shall be erected to resist fire spread to other buildings as required by the building bylaw.

(4) The maximum quantity of flammable liquids that shall be stored in any flammable liquid storage building or in a fire-resistive section attached to any building shall be as follows:
(a) 1000 gal of Class A flammable liquids or 2500 gal of Class B flammable liquids where an automatic fire extinguishing installation is not installed,
(b) 5000 gal Class A flammable liquids or 20,000 gal Class B flammable liquids where fire protection by an automatic sprinkler or water spray system is installed, or
(c) 2000 gal of Class A flammable liquids or 5000 gal Class B flammable liquids where carbon dioxide or dry chemical powder fire extinguishing systems are provided.

(5) Flammable liquids shall be stored inside buildings in accordance with the requirements for rooms containing flammable liquids in quantities not greater than the following:

(a) 500 gal of Class A flammable liquids or 1000 gal of Class B flammable liquids where an automatic fire extinguishing installation is not installed.

(b) 2500 gal of Class A flammable liquids or 10,000 gal of Class B flammable liquids where fire protection by an automatic sprinkler or water spray system is installed.

(c) 1000 gal of Class A flammable liquids or 2000 gal of Class B flammable liquids where carbon dioxide or dry chemical powder fire extinguishing systems are provided.

(6) The minimum distance of outside flammable liquid storage areas from major structures or property lines shall be as indicated in Table 2.1.6.A

TABLE 2.1.6.A
Forming Part of Sentence (6)

Total Quantity of Flammable liquid, gal	Distance from Adjoining Property Lines, ft	
	Class A	Class B
50	10	1
250	10	5
1000	10	10
2500	25	15
5000	50	25
5000+	75	50

(7) Drainage for inside storage and dispensing areas shall be provided so that

(a) an emergency system exists to carry away promptly any spilled or burning liquid together with any discharge from sprinklers a nd hose streams,

(b) there is one 4-in. drain or scupper for each 250 sq ft or fraction thereof of floor area,

(c) the effluent is carried through suitable screens and traps to a safe outside location such as a rock-filled pit or separator tank,

(d) no drain is connected to public drainage system, and,

(e) no flammable liquid can flow from doorwavs or gangways and spread uncontrolled from storage areas.

(8) Drainage for outside storage and dispensing areas shall be provided so the — Outside drainage
(a) spilled or burning liquid will run off to a safe area without involving buildings, equipment or other property, or
(b) spilled or burning liquid will be contained by dikes and conducted to a safe area by underground drains.

(9) Leakage inspections shall be made frequently and leaking, corroded or damaged containers immediately replaced. — Inspection for leakage

(10) Leakage from damaged flammable liquid containers shall be flushed away to a safe location or soaked up in an absorbent material and disposed of in a safe location.

(11) Stands of noncombustible construction shall be used to prevent direct contact between flammable liquid containers and the ground.

(12) Storage buildings and storage rooms for flammable liquids shall be ventilated according to their contents so that — Ventilation
(a) rooms storing more than 50 gal of Class A flammable liquids have positive exhaust ventilations with
(i) exhaust outlets located within 6 in. of the floor, and
(ii) an exhaust rate of 1 cu ft/min/sq ft of floor area, and
(b) rooms storing less than 50 gal of Class A flammable liquids or an acceptable quantity of Class B flammable liquids have in lieu of clause (a) ventilation provided by permanent openings at ceiling and floor level leading to the outside provided that there is at least 1 sq ft of inlet and 1 sq ft of outlet opening per 500 sq ft of floor area.

(13) The maximum possible explosion venting area shall be provided, but in no case shall that be less that a 1 sq ft of vent area to 50 cu ft of room volume. — Explosion venting

(14) Automatic explosion venting methods installed in buildings and rooms storing flammable liquids shall be designed to release at pressures from 20 to 30 lb/sq ft.

(15) Heat for flammable liquid storage and dispensing areas shall be provided by indirect means employing — Heating
(a) hot water or steam coils located on walls above the maximum height of flammable liquid containers, or
(b) electrical heaters of a type suitable for hazardous locations,
(c) forced air type heating as approved by the Fire Chief.

(16) Electrical installations shall be a type suitable for Class 1, Division 1, Hazardous Locations except that if a room is used for storage only, equipment suitable for Class 1, Division 2, Hazardous Locations, may be used. — Electricity

(17) Electrical equipment installed outside and within 5 ft of any opening to a room used for storing or dispensing flammable liquids shall conform to the requirements of sentence (16).

(18) Racks, ventilating ducts, hoists and other equipment including drums used for dispensing purposes shall have electrically bonded and grounded connections that — Static Electricity

(a) are connected by metal strapping or bare or insulated wire not less the No. 6 American Wire Gauge which is protected where necessary against mechanical injury, and

(b) shall have a ground resistance as low as possible and in no case greater than 25 ohms.

(19) Hoists, fans, hand tools, agitators and other equipment capable of producing frictional static sparks shall be of an nonsparking material or be constructed with any moving parts capable of producing static, properly grounded.

(20) Flammable liquids shall be stored in approved drums and containers or in approved safety cans except that Class B flammable liquids may be stored in ordinary closed metal containers of up to 5 gal individual capacity if not used for dispensing purposes. — Drums and containers

(21) Flammable liquids shall be dispensed from drums in the following manner: — Dispensing

(a) by means of approved drum pumps into a approved safety cans except that Class B flammable liquids may be dispensed by means of approved pumps.

(b) only one container is drawn from in the same instant, and

(c) all drums and containers used in dispensing operations are electrically bonded together and grounded.

(22) Smoking in storage and dispensing areas is prohibited and article 2.1.4.14. shall apply.

(23) Where carbon dioxide systems and dry chemical systems are required in this article they shall be installed only where the water supply is deficient for an automatic sprinkler or water spray system or where adequate drainage cannot be provided. A sign shall be prominently posted warning personnel of the danger of a malfunction of the protective system. — Fire protecti equipmen

TANK STORAGE OF FLAMMABLE LIQUIDS INSIDE BUILDINGS

2.1.6.8.(1) Tanks for storing Class A flammable liquids shall not be permitted inside buildings except where installed in special enclosures that are substantially liquid and vapour-tight without backfill, and also have — Class A flammab liquids

(a) sides, top and bottom of the enclosure constructed of masonry or reinforced concrete having a fire resistance rating of at least 3 hr with openings for inspection at the top of the enclosure, and

(b) tank connections that are so piped or closed that neither vapours nor liquid can escape into the enclosed space.

(2) Exceptions may be made for the above requirement where the Inspector approves an installation for a special process or experimental use that has additional automatic fire protection equipment and where structural safeguards are provided.

(3) Where tanks containing Class A flammable liquids are permitted inside buildings they shall be limited in capacity to 5000 gal individual or 10,000 gal aggregate capacity if located in the lowest floor or basement in any building or fire section thereof.

Class B flammable liquids

(4) Unenclosed tanks of Class B flammable liquids of over 50 gal capacity shall not be used above the lowest storey or basement of a building except where the Inspector approves an installation for a special process or experimental use that has additional automatic fire protection equipment and where structural safeguards are provided.

(5) Unenclosed tanks of Class B flammable liquids containing up to 250 gal individual capacity or 500 gal aggregate capacity are permitted in the lowest storey or basement of any building or fire section thereof and shall be located so that any fire or open flame is 5 ft horizontal distance from a tank, except small supply tanks of 9 gal or less capacity listed as part of or for use with oil burning stoves and similar equipment.

Tank enclosures

(6) Tanks containing Class B flammable liquids that exceed 250 gal individual capacity or 500 gal aggregate capacity in an individual building or in a section of a building separated by fire walls shall be installed in an enclosure with walls of solid masonry units or poured concrete construction having a fire resistance rating of not less than 3 hr and bonded to the floor. The floor shall be of concrete or other fire-resistive construction the walls may be extended and bonded to the underside of the fire-resistive construction in lieu of a separate top. At least 15 in. of clearance shall be left around the tank for the purpose of inspection and repair.

Wall openings

(7) Wall openings to the tank enclosure shall be protected by approved enclosures having a 3-hr fire resistance rating and liquid-tight ramps, sills or walls of sufficient elevation and strength to contain the total capacity of the tank.

Tank capacity Class B flammable liquids

(8) Tanks containing Class B flammable liquids shall be limited to 20,000 gal individual or 40,000 gal aggregate capacity if located on the lowest floor or basement and 4000 gal aggregate capacity if located above the first floor or basement in any one building or fire section of a building.

Auxiliary tanks

(9) Auxiliary tanks for the storage of flammable liquids shall be located at a level above the top of the supply tank from which they are filled, otherwise their installation requirements shall be similar to those for proper storage tanks.

Tank supports

(10) All tanks containing flammable liquids shall be securely supported by means of noncombustible supports to prevent settling, sliding or lifting, and

(a) tanks in excess of 250 gal individual capacity shall be supported at least 4 in. above the floor by means of masonry or concrete saddles at least 8 in. thick which support at least 1/3 the circumference of the tank, and

(b) steel supports if used shall be protected with at least 2 in. of concrete or equivalent.

Construction of tanks

(11) Tanks manufactured to contain flammable liquids shall be constructed in accordance with good practice.

(12) Unenclosed tanks for the storage of flammable liquids shall conform to Table 2.1.6.B.

TABLE 2.1.6.B.
Forming Part of Sentence (12)

Capacity, gal.	Minimum Thickness of Steel	
	Not Galvanized	Galvanized
	Gauge No.+	Gauge No.+
10 or less	18	20
11 to 150	16	–
151 to 250	14	--

+ United States Standard Metal Gauge

TABLE 2.1.6.C
Forming Part of Sentence (13)

Capacity, gal	Maximum Diameter, in.	Gauge No.+	Approximate Thickness, in.
0- 250	42	14	5/64
251- 500	48	12	7/64
501- 1000	64	10	9/64
1001- 3330	84	7	3/16
3331- 10,000	126	3	1/4
10,001 - 16,600	144	0	5/16
16,601 - 25,000	144	000	3/8

+ United States Standard Metal Gauge

(13) Horizontal tanks for the storage of flammable liquids shall conform to Table 2.1.6.C, and in addition
(a) the over-all length shall not be greater than 6 times the diameter,
(b) a conical head shall have a height of not less than 1/12 the diameter, and
(c) a dished head shall have a dish height as indicated in Table 2.1.6.D.

TABLE 2.1.6.D
Forming Part of Sentences (13) and (14)

Diameter, ft.	Minimum Dish, in.
0 - 5	1 1/2
5 - 6	2
6 - 7	2 1/2
7 - 8	3 1/2
8 - 9	4 1/2
9 - 10	5 1/2
10 - 11	7
11 - 12	8

(14) Vertical cone bottom tanks for the storage of flammable liquids shall conform to Table 2.1.6.E, and in addition
(a) the over-all height shall not be greater than 4 times the diameter,
(b) if the diameter exceeds that allowed for unbraced flat tops, the top shall be dished conical or reinforced in an approved manner,
(c) the height of a conical top or bottom shall be not less than 1/12 the diameter, and
(d) the height of a dished top shall be as indicated in Table 2.1.6.D.

TABLE 2.1.6.E
Forming Part of Sentence (14)

Capacity, gal	Maximum Diameter, in.	Maximum Diameter Unbraced Flat Top, in.	Gauge No. +
0- 250	43	36	14
251- 500	54	43	12
501- 1000	68	54	10
1001- 3330	105	72	7
3331-10,000	132	96	3
10,001-16,600	144	120	0
16,601-25,000	144	132	000

+ United States Standard Metal Gauge.

(15) Tanks and piping constructed for the inside storage of flammable liquids shall be tested hydrostatically or with air pressure before being covered, enclosed or placed in use. The pressure test shall be not less than 1 1/2 times the maximum working pressure but not less than 5 lb/sq in. and not more than 10 lb/sq in. measured at the highest point in the system except that when the vertical length of the fill and vent pipes creates a static head of more than 10 lb pressure per sq in. the tank and related piping shall be tested hydrostatically to a pressure equal to the static head thus imposed. In special cases where the height of the vent above the tank is excessive, the hydrostatic test pressure shall be specified by the Inspector. Testing of tanks and pipi

(16) Venting of tanks used for storage of flammable liquids inside of buildings shall be such that Vents
(a) tanks having a capacity of more than 50 gal are provided with open vents or approved automatically operated vents, and
(b) tanks of 50 gal capacity or less are vented as required in clause (a) or have approved combination fill, vent, gauging and flame arrestor fitting.

TABLE 2.1.6.F.
Forming Part of Sentence (17)

Tank Capacity, gal	Minimum Diameter Of Vent, in.
0- 500	1 1/4
501- 1000	1 1/2
1001- 2500	2
2501- 5000	2 1/2
5001- 10,000	3
10,001- 25,000	4

(17) The size of vents required by sentence 16(a) shall be as indicated in Table 2.1.6.F but not smaller than the fill or withdrawal connections, where tight connections are used. Vent sizes

(18) Vent pipes from storage tanks for flammable liquids located inside buildings shall be installed so that

(a) pipes from storage tanks containing Class A flammable liquids terminate outside the building at least 3 feet from any building opening and at least 12 feet above the adjacent ground level but not more than 20 feet above the top of the tank,

(b) pipes from tanks containing more than 50 gal of Class A flammable liquids discharge upwards or horizontally from the ground, not downward towards the ground,

(c) pipes from tanks exceeding 50 gal, of Class B flammable liquids terminate outside the building at least 3 ft. from any building opening and at least 10 ft. above the ground level or above the normal snow level.

(d) vent outlets from tanks containing more than 50 gal of flammable liquids are fitted with return bends, coarse screens or other devices to prevent the ingress of foreign material,

(e) where "open type" fill connections are used, the vent pipes shall extend above the level of the fill connections,

(f) the pipes are installed so as to drain towards the tank without sags or traps in which flammable liquid can collect and located so as not to be subject to physical damage, and,

(g) the low ends of the vent pipes enter the tank through the top and do not extend more than 1 in. into the top of the tank.

(19) Vent pipes from tanks containing liquids of similar properties may be connected into one common outlet pipe provided it is adequate in size for the total tank volume to which it is connected. In no case should the point of connection between vent lines be lower than the top of any fill pipe opening.

(20) Vent pipes shall not be cross connected with fill pipes.

(21) Flame arrestors shall be provided on inside storage tanks when Flame arrestors

(a) Class A flammable liquids are being stored,

(b) Class B flammable liquids are stored in a tank exposed to combustible construction or material, and,

(c) a tank contains a flammable liquid that can be heated to its flash point under normal operating conditions.

(22) A heating arrangement such as a steam coil shall be provided at the flame arrestor to avoid obstruction of the vent when liquids with a high melting point are stored where they are likely to solidify during cold weather.

(23) Conservation vents when used on inside storage tanks for flammable liquids shall be of an approved type that provide both vacuum and pressure relief within the safe operating pressure limits of the tank. The use of a conservation vent does not preclude the need for a flame arrestor unless it is an approved combination flame arrestor vent valve unit. Conservation vents

(24) Pipe connections to inside storage tanks containing flammable liquids shall be made through either standard steel or wrought iron pipe couplings fastened to the tank by welding or riveting. Connections for horizontal storage tanks shall be in a line parallel with the longitudinal axis and above the highest liquid level. Tank connection and fittings

(25) Fill pipe openings shall be located outside the building so that Fill and dischage piping

(a) pipe openings are 5 ft from any building opening for tanks containing Class A flammable liquids, and

(b) pipe openings are 2 ft from any building at the same or lower level for tanks containing Class B flammable liquids.

(26) Fill and discharge pipes shall be arranged to
(a) drain towards the tanks,
(b) enter the tanks through the top except for Class B flammable liquids when top connections are not practicable, and,
(c) permit tanks storing Class A flammable liquids to be bottom filled.

(27) The discharge pipe from a tank for the inside storage of flammable liquids shall extend to a point below the permanent liquid level and the fill return and similar pipes shall extend below the level of the discharge pipe or be provided with suitable traps to prevent exposure of the vapour space above the liquid.

(28) Fill pipes for inside storage tanks shall have a minimum internal diameter of 2 in. and a maximum internal diameter of 4 in.

(29) Fill pipe openings in inside storage tanks shall be closed and liquid-tight when not in use and identified by a colour scheme or other means.

(30) Auxiliary tanks for inside storage shall be provided with overflow pipes draining to the supply tank and extending not more than 1 in. into the top of the supply tank. Overflow pipes shall have no valves or other obstructions. Overflow piping

(31) Cross connections permitting gravity flow from one inside tank to another are not permitted except between 2 supply tanks not exceeding 250 gal individual capacity. Where 2 unenclosed inside supply tanks are filled through a common line, a separate cross-over pipe connecting the 2 tanks shall be provided and of a size equal to or greater than the fill pipe. Cross connections

(32) Inside tanks for flammable liquid storage that have a capacity greater than 1000 gal shall be provided with a man-hole at the top of the tank that — Man-holes
(a) is not less than 18 nor more than 20 in. in diameter, and
(b) is fitted with a bolted, gasketed cover that will be kept closed except when the tank is opened for examination or repair.

(33) Shut-off valves shall be provided for all connections to tanks which permit gravity flow from the tank. — Valves

(34) Approved gauging devices for determining the liquid level in tanks shall be provided which will not expose the vapour space above the liquid surface. Devices which would permit the release of liquid if they were damaged mechanically or by an exposure fire shall be avoided wherever possible. — Gauging devices

(35) Where inside storage tanks require heating facilities they shall be arranged so that — Heating equipment
(a) heat shall be provided only in the vicinity of the discharge outlet,
(b) only enough heat shall be provided to ensure the free flow of the liquid, and
(c) the discharge pipe connections shall be so arranged as to ensure that the heating coils are always submerged below the liquid surface.

(36) At least one portable extinguisher of not less than 20-B classification shall be provided in the area where storage tanks containing Class A flammable liquids are located. — Fire protection equipment

(37) At least one portable extinguisher of not less than 20-B classification shall be provided in the area where storage tanks for Class B flammable liquids having a capacity greater than 500 gal are located.

(38) Fire protection equipment where required shall meet the requirements of the Inspector.

TANK STORAGE OF FLAMMABLE LIQUIDS IN UNDERGROUND TANKS

2.1.6.9.(1) A single underground storage tank for flammable liquids shall not exceed 25,000 gal capacity.

(2) Underground tanks for the storage of flammable liquids shall be located at least 5 ft from building foundations and 3 ft from other tanks and pipe-lines. — Location and installation

(3) Underground tanks shall be set on a firm foundation and surrounded with soft earth or sand well tamped in place. The tanks shall be covered with a minimum of 3 ft. of earth or shall be covered with not less than 1 ft. of earth on top of which shall be placed a slab of reinforced concrete not less than 6 in. thick.

(4) 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 ft of earth cover or 18 in. of well tamped earth plus 6 in. of reinforced concrete or 8 in. of asphaltic concrete. When asphaltic or reinforced concrete is used as part of the protection it shall extend at least 1 ft. horizontally in all directions beyond the outline of the tank.

(5) The equivalent of a location below ground may be obtained with a substantial portion of the tank above grade. Earth shall be placed over the tank to form a 2-ft cover at the angle or repose of the fill used. A concrete retaining wall or lock sheet steel piling may be placed around the tank and filled with earth to reduce space requirements.

(6) Where an underground tank 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, it shall be securely anchored to a concrete slab to resist the buoyant effect of the water when the tank is empty. Anchorage

(7) Clean gravel, sand or sandy loam back-fill shall be used for buried tanks wherever possible. Cinder fill or earth fill containing coal dust or other corrosive material shall be avoided. Tanks shall be located above the ground water if the ground water is corrosive. Corrosion protection

(8) Underground storage tanks shall be painted with at least one coat of red lead in linseed oil and one coat of asphalt or coal tar base paint over a clean dry surface. Other paint formulations may be used which provide equivalent protection subject to the approval of the Inspector.

(9) Underground storage tanks shall be constructed to conform with the requirements of article 2.1.6.8. sentences (11), (13), (14) and (15) and as indicated in Table 2.1.6.G. Construction of tanks

(10) Tanks and piping constructed for the underground storage of flammable liquids shall be tested in accordance with the requirements of article 2.1.6.8., sentence (15). Testing of tanks and piping

(11) All underground tanks shall be provided with open vents or approved automatically operated vents to prevent abnormal pressures during tank filling and emptying operations. Vents

(12) Vent sizes shall be as indicated in Table 2.1.6.H but not smaller than the fill or withdrawal connections where tight connections are used. Vent sizes

(13) Vent pipes from underground storage tanks shall be installed so that

TABLE 2.1.6.G
Forming Part of Sentence (9)

Capacity, gal.	Min. Plate Thickness gauge no.†	Max and Min Plate Thickness as per Accepted Mill Practice, in.	Inside Diameter, in.	Inside Length, in.
500	12	.1120 - .0972	46	86
1000	10	.1419 - .1271	50	145
1000	7	.1903 - .1719	50	145
2000	7	.1903 - .1719	72	140
3000	7	.1903 - .1719	72	210
4000	3	.2745 - .2353	84	206
5000	3	.2745 - .2353	84	257
10,000	3	.2745 - .2353	108	312
15,000	0	.3427 - .2938	132	300
20,000	000	.4122 - .3533	132	408

† United States Standard Metal Gauge

(a) pipes from tanks containing Class A flammable liquids terminate outside and at least 3 ft from any building opening and at least 12 ft above the adjacent ground level but not more than 20 ft above the top of the tank, — Installation of vent pipes
(b) pipes from underground tanks discharge upwards or horizontally from the ground, not downward towards the ground,
(c) pipes from tanks containing Class B flammable liquids terminate outside and at least 3 ft from any building opening and at least 3 ft above the normal snow level, but should not extend more than 20 ft above the top of the tank,
(d) vent outlets from underground tanks containing Class B flammable liquids are fitted with return bends or coarse screens to minimize the ingress of foreign matter, and
(e) article 2.1.6.8., sentence 18(e),(f) and (g) is complied with.

TABLE 2.1.6.H
Forming Part of Sentence (12)

Tank Capacity, gal	Minimum Diameter of Vent, in.
0 - 500	1
501 - 1000	1 1/4
1001 - 2500	1 1/2
2501 - 5000	1 1/2
5001 - 10,000	2
10,001 - 25,000	3

(14) Flame arrestors for underground storage tanks shall meet the requirements of article 2.1.6.8., sentences (21) and (22). — Flame Arrestors

(15) Conservation vents for underground storage tanks shall meet the requirements of article 2.1.6.8., sentence (23). — Conservation vents

(16) Pipe connections to underground storage tanks shall be made through either standard steel or wrought iron pipe couplings welded to the tank. — Tank connections and fittings

(17) Pipe connections for horizontal underground storage tanks shall be in a line parallel with the longitudinal axis and above the highest liquid level except as permitted in sentence (18).

(18) Where pipe connections to underground tanks are required to be grouped, the openings may be located up to 12 in. off centre of the longitudinal axis with the fitting terminated above the top of the shell.

(19) Pipe connections for vertical underground tanks shall be located in the top of the tank.

(20) Fill and discharge piping for underground tanks shall meet the requirements of article 2.1.6.8. sentences (16), (27), (28) and (29). — Fill and Discharge piping

(21) Overflow piping for underground tanks shall meet the requirements of article 2.1.6.8., sentence (30) — Overflow piping

(22) Cross connections which permit gravity flow from one tank to another are not permitted. — Cross connection

(23) Man-holes shall be provided as required in article 2.1.6.8., sentence (32) for tanks up to 10,000 gal. Underground tanks of 10,000 gal or over shall have man-hole openings reinforced with plates in accordance with good practice. — Man-holes

(24) Gauging devices shall be provided as specified in article 2.1.6.8., sentence (34). — Gauging devices

(25) Where underground storage tanks require heating facilities they shall be provided as outlines in article 2.1.6.8., sentence (35). — Heating equipment

(26) Fire protection equipment shall be provided in the vicinity of pumping and ancillary equipment as required in article 2.1.6.10. — Fire protection equipment

TANK STORAGE OF FLAMMABLE LIQUIDS IN ABOVE GROUND TANKS

2.1.6.10(1) The locating of above ground storage tanks shall take into consideration

(a) the possibility of damage to nearby buildings or tanks,
(b) the protection of important buildings by utilizing sloping ground or diked enclosures and locating the buildings upwind from the storage tanks,
(c) the provision of adequate access for fire fighting, and
(d) the likelihood of an area to be flooded.

(2) The minimum distance from any part of a flammable liquid storage tank up to 40,000 gal capacity other than crude petroleum storage tanks, to the nearest building or property line shall be in accordance with Table 2.1.6.I unless otherwise authorized by the Provincial Fire Marshal.

TABLE 2.1.6.I
Forming Part of Sentence (2)

Capacity, gal.	Distance for Class A Flammable Liquids, ft.	Distance for Class B Flammable Liquids ft
0- 250	10	1
251- 625	10	5
626- 10,000	15	10
10,001- 20,000	15	15
20,001- 25,000	20	20
25,001- 40,000	25	25

(3) The minimum distance from any part of a flammable liquid storage tank greater than 40,000 gal capacity other than crude petroleum storage tanks, to the nearest building or property line shall not be less than 1/2 times the greatest dimension of the tank, but need not exceed 175 ft. If the tank is protected by an approved fixed extinguishing system or an approved floating roof, the minimum distance shall not be less than the greatest dimension of the tank but need not exceed 120 ft.

(4) The minimum distance from the nearest building or property line to any part of a storage tank containing crude petroleum or other flammable liquid subject to boil over shall not be less than 3 times the greatest dimension of the tank, except that such distance shall not be less than 20 ft and need not exceed 350 ft. If the tank is protected by an approved fixed extinguishing system or an approved floating roof the minimum distance shall not be less than 2 times the greatest dimension of the tank except that such distance shall not be less than 20 ft and need not exceed 175 ft.

(5) The location of storage tanks with respect to railway properties shall be in accordance with good practice.

Distan betwee tanks railwa tracks

(6) The minimum distance from any part of a flammable liquid storage tank to a main track of a railway shall be as required by Table 2.1.6.J, and in addition

(a) tanks containing crude petroleum shall be located not less than 250 ft from railway main track, and

(b) open top storage tanks shall be located not less than 400 ft from railway track.

TABLE 2.1.6.J
Forming Part of Sentence (6)

Capacity, gal	Distance for Class A Flammable Liquids ft	Distance for Class B Flammable Liquids, ft.
500 - 20,000	70	35
20,001 - 40,000	80	40
40,001 - 60,000	90	45
60,001 - 100,000	100	50
100,001 - 150,000	110	55
150,001 - 250,000	120	60
250,001 - and over	150	75

(7) Above ground storage tanks shall be separated from each other by a distance at least equal to 1/2 the diameter of the smaller tank, but in no case less than 3 ft.

(8) Above ground storage tanks containing Class A flammable liquids may be grouped, but the total capacity of the tanks in any one group shall not exceed 100,000 gal.

(9) Above ground storage tanks containing Class B flammable liquids may be grouped, but the total capacity of the tanks in any one group shall not exceed 200,000 gal.

(10) Tank groups of above ground storage tanks shall be separated from one another by a distance of not less than 25 ft. Tanks within 25 ft of each other are considered as one tank or group of tanks.

(11) The minimum separation between a liquefied petroleum gas container and a tank containing flammable liquid shall be 20 ft. Suitable means shall be taken to prevent the accummulation of flammable liquidsunder adjacent liquefied petroleum gas containers such as by diking, diversion curbs or grading. When tanks containing flammable liquids are diked, the liquefied petroleum gass containers shall be outside of the diked area and at least 10 ft away from the centre line of the dike. The foregoing provisions shall not apply when liquefied petroleum gas containers of 105 gal or less are installed adjacent to tanks of 250 gal or less capacity containing flammable liquids of Class B.

Dikes

(12) Individual tanks or groups of tanks exceeding 10,000 gal capacity for Class A flammable liquids and 20,000 gal capacity for Class B flammable liquids shall be diked or the yard shall be curbed or other suitable means taken to prevent the spread of liquid to valuable property or waterways.

(13) Individual tanks or groups of tanks of capacities less than described in sentence (12) shall be similarly protected where required by the Inspector due to the proximity of waterways, structures of high value, places of habitation and assembly or the character of the topography.

(14) Individual tanks of capacities exceeding 100,000 gal for Class A flammable liquids and 200,000 gal for Class B flammable liquids shall be provided with a separate dike.

(15) Tanks up to a total capacity of 100,000 gal of Class A flammable liquids or up to 200,000 gal of Class B flammable liquids may be grouped in a single diked area.

(16) The net volumetric capacity of the diked area shall be equal to that of the largest tank plus 10% of the aggregate capacity of all the other tanks within the diked area.

(17) Dikes shall be constructed of earth, steel, concrete or solid masonry and designed to be liquid-tight and to withstand the full hydraulic head. Earthern dikes over 3 ft in height shall have a flat section at the top at least 2 ft wide. The slope shall be consistent with the angle of repose of the material of which the dikes are constructed. Steel dikes shall be restricted to a height of 6 ft above grade. The area within the dikes shall be surfaced with concrete, crushed stone or other hard noncombustible surface material.

Dike construction

(18) The space within a dike and the sides and top of the dike shall at all times be kept cleared of all dry grass, weeds, shrubbery, trees and combustible materials of any nature.

Control of waste combustibles

(19) Drainage systems shall be provided, designed to remove surface water and arranged to discharge to safe locations. Drains shall be normally closed. Where pumps are used to control damage they shall not be self-starting.

Drainage

(20) Tanks shall be built of steel, aluminum or concrete unless the character of liquid stored requires other materials. Tanks built of materials other than steel shall be designed to specifications embodying safety factors equivalent to those herein specified for steel tanks. — Construction of tanks

(21) Steel tanks shall be constructed in accordance with article 2.1.6.8., sentence (11). No "seconds" or used material shall be specified for use.

(22) Joints shall be welded or riveted and caulked, or made tight by other approved process. In the case of vertical tanks, the joint between roof and shell shall be weaker than any other joints in the shell of the tank.

(23) Atmospheric tanks to contain flammable liquids shall be built in accordance with good practice. — Field erected vertical tanks

(24) Low pressure tanks shall be built in accordance with good practice.

(25) Production tanks not exceeding 105,000 gal (3000 bbl) individual capacity when used for crude petroleum storage in oil-producing areas shall be built in accordance with good practice.

(26) Shop-built tanks shall be fabricated to meet a standard satisfactory to the Inspector. — Shop-built tanks

(27) Small vertical tanks for the storage of flammable liquids above ground in quantities not exceeding 1000 gal capacity shall be constructed with a wall thickness according to capacity as shown in Table 2.1.6.K.

TABLE 2.1.6.K
Forming Part of Sentence (27)

Capacity, gal	Minimum Thickness of Steel, gauge no. +
1 - 50	18
51 - 290	16
291 - 450	14
451 - 1000	12

+ United States Standard Metal Gauge.

(28) For large vertical tanks containing from 1000 to 25,000 gal and up to 25 ft in height the shell shall be not less than 3/16 in. thick. For tanks from 25 to 30 ft in height the bottom ring shall be not less than 1/4 in. thick and the remainder of the shell not less than 3/16 in. thick. For tanks between 30 and 35 ft high the first 2 rings shall be not less than 1/4 in. thick and the remainder of the shell not less than 3/16 in. thick. All 1/4 in. rings shall be not less than 5 ft. wide. — Large Vertical tanks

(29) The roofs of large vertical tanks shall be either dished or conical shaped and of not less than No. 10 United States Standard Metal Gauge.

(30) The diameter of large vertical tanks shall be not less than 1/4 times the height but not less than 4 ft nor more than 12 ft. The height shall not exceed 35 ft.

(31) The height of conical tops on large vertical tanks shall be not less than 1/6 of the radius.

(32) The height of dished tops on large vertical tanks shall be in accordance with Table 2.1.6.L.

TABLE 2.1.6.L.
Forming Part of Sentence (32)

Diameter, ft.	Minimum Dish, in.
0 - 5	1 1/2
5 - 6	2
6 - 7	2 1/2
7 - 8	3 1/2
8 - 9	4 1/2
9 - 10	5 1/2
10 - 11	7
11 - 12	8

(33) The wall thickness of small horizontal tanks for storing flammable liquids shall be in accordance with Table 2.1.6.M

(34) The wall thickness of large horizontal tanks from 1000 to 30,000 gal capacity for storing flammable liquids shall be as shown in Table 2.1.6.N.

(35) Tank heads on large horizontal tanks shall be dished, stayed, braced or reinforced and
(a) the length of the tank shall be not less than the diameter nor more than 6 times the diameter which shall not exceed 12 ft.
(b) the height of conical heads shall be not less than 1/12 the diameter of the tank, and
(c) the height of dished heads shall be as indicated in sentence (32).

TABLE 2.1.6.M
Forming Part of Sentence (33)

Capacity, gal	Minimum Thickness of Steel gauge no. +
1 - 50	18
51 - 250	14
251 - 450	12
451 - 1000	10

+ United States Standard Sheet Gauge

TABLE 2.1.6.N
Forming Part of Sentence (34)

Maximum Diameter	Minimum Thickness of Steel gauge no. †
6 ft or less	7 (3/16 in.)
6 ft 1 in. to 12 ft.	3 (1/4 in.)

† United States Standard Metal Gauge

(36) When special tank linings are used to provide corrosion resistance the construction shall have strength equivalent to that required for steel tanks.

(37) Above ground tanks shall be tested as specified in articles 2.1.6.8., sentence (15)

(38) Vertical, above ground storage tanks for flammable liquids shall be supported directly on the ground. An initial excavation shall be made 4 ft larger in diameter than the tank sufficient to remove the top soil and vegetation, but not less than 6 in. deep. The site shall be levelled and a backfill of clean gravel, sand or sandy loam applied in well tamped layers. The use of clay, silt, ashes or cinder backfill shall be avoided to minimize the possibility of external corrosion. The fill shall then be topped with a 6-in. layer of coarse sand or crushed rock or slag topped with a 1-in. layer of coarse sand. The centre of the pad shall be from 2 in. to 6 in. higher than the outer edge. A 3-in. layer of crushed rock or slag shall be provided at the outer edge of the pad and surfaced with asphalt or similar paving material to prevent the movement of fines.

(39) Where conditions are such that poor soil support under the vertical tank presents the possibility of the loss of supporting material, a concrete retaining ring wall shall be provided to prevent the sand pad from being washed away. The space between the tank and ring shall be flashed with asphalt to prevent the entrance of moisture which may cause erosion to the underside of the tank.

(40) Horizontal tanks for the above ground storage of flammable liquids shall be protected and supported so that
(a) tanks having a capacity not greater than 250 gal shall be supported by means of noncombustible supports,
(b) tanks whose capacity exceed 250 gal rest on fire-resistive supports such as brick or reinforced concrete on adequate footings, or
(c) steel supports, if used, are protected by at least 2 in. of concrete or equivalent, and
(d) tank saddles shall be at least 8 in. wide and support at least 1/3 the circumference of the tank.

(41) Tank sites shall be sufficiently elevated so that the tanks may not become buoyant due to a rise in the level of the watertable or due to the effect of flood water; however, if such conditions do exist protection shall be provided by
(a) foundations that have ample bearing to secure footing,
(b) hold-down rods, straps and anchorages to resist the buoyancy force which would be exerted if the tank were empty,
(c) tank fill and vent connections designed to prevent the displacement of the contents of the tank by flood water, and
(d) barricades provided to prevent damage to the tanks by floating debris.

(42) Normal breathing provided by vents in vertical coneroofed tanks should be accomplished at a pressure not greater than 3 in. of a water column and a maximum vacuum pressure of a 1 3/4-in. water column.

(43) Normal breathing in horizontal tanks designed according to the preceding specifications may be safely accomplished at pressures up to 5 lb/sq in.

(44) Emergency relief vents are required on all above ground flammable liquid storage tanks to relieve excessive internal pressure caused by exposure fires which might otherwise rupture the tank shell or bottom.

(45) Emergency venting of above ground storage shall be accomplished by one of the following:
(a) additional or larger breathing vents,
(b) a self-closing gauge-hatch or man- hole cover,
(c) a man-hole cover with long bolts permitting the cover to lift under internal pressure,
(d) a weak seam between the roof and shell,
(e) a floating roof, or
(f) other forms of construction providing a demonstrably weak attachment.

(46) For tanks up to 25,000 gal capacity thermal and relief venting shall be provided to conform to the requirements of Table 2.1.6.O and in no case where tight connections are used shall the vent size be smaller than the fill or withdrawal connection.

Table 2.1.6.O
Forming Part of Sentence (46)

Capacity, gal	Vent Diameter in.
0 - 500	1 1/4
501 - 1000	1 1/2
1001 - 2500	2
2501 - 5000	2 1/2
5001 - 10,000	3
10,001 - 25,000	4

(47) Breathing vents on tanks of capacities greater than 25,000 gal shall be of adequate size to provide the required thermal inbreathing capacity (vacuum) and thermal outbreathing capacity (pressure) as indicated in Table 2.1.6.P and to permit the maximum outflow (vacuum) and inflow(pressure) of liquid as indicated in Table 2.1.6.Q.

TABLE 2.1.6.P
Forming Part of Sentence (47)

Thermal Venting Capacities, cu. ft of air/hr				
Tank Capacity		Vacuum	Pressure	
Gallons	35-Gal Barrels	All Stocks	Flash Point Less than 100° F	Flash Point 100° F and over
35,000	1000	1000	1000	600
70,000	2000	2000	2000	1200
105,000	3000	3000	3000	1800
140,000	4000	4000	4000	2400
175,000	5000	5000	5000	3000
350,000	10,000	10,000	10,000	6000
525,000	15,000	15,000	15,000	9000
700,000	20,000	20,000	20,000	12,000
875,000	25,000	24,000	24,000	15,000
1,050,000	30,000	28,000	28,000	17,000
1,225,000	35,000	31,000	31,000	19,000
1,400,000	40,000	34,000	34,000	21,000
1,575,000	45,000	37,000	37,000	23,000
1,750,000	50,000	40,000	40,000	24,000
2,100,000	60,000	44,000	44,000	27,000
2,450,000	70,000	48,000	48,000	29,000
2,800,000	80,000	52,000	52,000	31,000
3,150,000	90,000	56,000	56,000	34,000
3,500,000	100,000	60,000	60,000	36,000
4,200,000	120,000	68,000	68,000	41,000
4,900,000	140,000	75,000	75,000	45,000
5,600,000	160,000	82,000	82,000	50,000
6,300,000	180,000	90,000	90,000	54,000

TABLE 2.1.6.Q
Forming Part of Sentence (47)

Filling and Emptying Venting Capacities, in cu ft of air/hr			
Pumping Rate	Vacuum	Pressure	
	All Stocks	Flash Point Less than 100°F	Flash Point 100°F and Over
Barrels per hr.	5.6	12.0	6.0
Gallons per min.	9.6	20.0	10.0

(48) Emergency relief vents that are required to be installed on above ground tanks shall be sized as indicated in Table 2.1 6 R.

(49) Breathing vents may serve as emergency relief vents provided they have the requisite capacity under the pressure limitations in Table 2.1.6.R.

TABLE 2.1.6.R
Forming Part of Sentence (49)

Total Pressure Relief Capacity of Vents						
Tank Capacity		Minimum Total Pressure Relief Capacity	Approximate Diameter in Inches of Free Circular Openings - Various Pressures			
Gallons	35-gal Barrels	Cu Ft Free Air/Hr	3 in Water	1 psi	2 1/2 psi	5 psi
835 or less	23.8	25,300	4	2 1/2	2	1 1/2
3,330	95.2	69,500	6 3/4	3 3/4	3	2 1/2
15,000	428	139,000	9 1/2	5 1/2	4 1/4	3 3/4
20,000	595	166,000	10 1/4	6	4 3/4	4
46,000	1330	253,000	12 3/4	7 1/4	5 3/4	5
83,300	2380	363,000	15 1/4	8 3/4	7	6
129,000	3690	458,000	17 1/4	9 3/4	7 3/4	6 1/2
185,000	5290	522,000	18 1/4	10 1/2	8 1/4	7
396,000	11,300	624,000	20	11 1/4	9	7 3/4
612,000	17,500	648,000	20	11 1/2	9 1/4	7 3/4
Unlimited	-	648,000	20	11 1/2	9 1/4	7 3/4

(50) Emergency relief vents of the self-closing type can be regarded as satisfying 1/2 the required venting for inflow of flammable liquids with flash points below 100°F or 1/2 the required thermal pressure venting for any flammable liquid.

Flame arrestors

(51) Flame arrestors for above ground storage tanks shall meet the requirements of article 2.1.6.8., sentences (21) and (22)

Conservation vents

(52) Conservation vents when used shall be of an approved type to provide both vacuum and pressure relief within the safe operating pressure limits of the tank.

Vents pipes

(53) Vent pipes from above ground tanks storing flammable liquids shall be arranged to discharge to safe locations.

(54) Open vents on above ground storage tanks shall be hooded or terminated in U-bends to keep out rain. Horizontal runs of pipe shall drain back to the tank. The low end of vent pipes shall extend no more than 1 in. into the top of the tank.

Vent pipes

(55) Vent installed on above ground storage tanks shall terminate close enough above the level of the tank to avoid imposing a dangerous liquid head on the tank should liquid overflow through the vent. On cylindrical tanks the height of the vent pipe shall be not more than 20 ft above the tank. Within these limits the vent pipe shall extend above the level of the fill connections where an open type fill connection without tight fittings is provided.

(56) Pipe connections to above ground storage tanks shall be made through either standard steel or wrought iron pipe couplings fastened to the tank by welding or riveting. — Tank connections and fittings

(57) Top connections to above ground storage tanks shall be used wherever practicable. The discharge pipe shall extend to a point below the permanent liquid level and the fill return and similar pipes shall extend below the level of the discharge pipe or be provided with suitable traps to prevent the exposure of a vapour space above the liquid. — Fill and discharge piping

(58) Bottom connections to above ground storage tanks shall have shut-off valves bolted directly to the outlet nozzle, which shall be kept closed except when liquid is being withdrawn or the tank is being filled. Normally, a single connection shall serve both for the filling and the discharge of the tank. When tanks are located in an enclosure, valves shall be provided in an accessible place outside the enclosure.

(59) A man-hole shall be provided in the top of each above ground tank over 4000 gal capacity of not less than 18 in. diameter. Vertical tanks shall have 2 man-holes to ventilate the tank when cleaning, one on the top and one on the side near the bottom. — Man-holes

(60) Man-holes in above ground storage tanks shall be fitted with a bolted gasketed cover which is kept closed except when the tanks are open for examination or repair.

(61) Approved gauging devices for determining the liquid level in tanks shall be provided which will not expose the vapour space above the liquid surface. Devices which would permit the release of liquid if they were damaged mechanically or by an exposure fire shall be avoided wherever possible. — Gauging devices

(62) Where above ground storage tanks require heating facilities they shall be provided as outlined in article 2.1.6.8., sentence (35). — Heating equipment

(63) Where 40,000 gal or more of Class A flammable liquids are stored in individual tanks, suitable fire control devices shall be provided that are capable of extinguishing a fire in the largest of the tanks. The design and amount of such equipment shall be in accordance with nationally recognized standards. — Fire protection equipment

(64) Electrical wiring and equipment installed above the roof and within the shell of a vertical tank having a floating roof or installed less than 5 ft from an open tank vent shall be suitable for Class I, Division I, Hazardous Locations. — Electrical equipment near tanks and vents

(65) Electrical wiring and equipment installed within 10 ft of an open vent or any part of the tank or inside the diked area to the level of the top of the dike and within 25 ft of the tank shall be suitable for Class I, Division 2, Hazardous Locations.

FLAMMABLE LIQUIDS

PUMPING AND PIPING SYSTEMS

2.1.6.11.(1) Piping shall be installed outdoors wherever possible and located so as not to expose important buildings or equipment. The point of entrance to buildings shall be arranged so that the piping within the building is direct and as short as possible. — Location and arrangement of piping

(2) Above ground outdoor piping shall be supported in a substantial and properly constructed manner and arranged to prevent excessive vibration or strain on connecting equipment. — Above ground outdoor piping

(3) Horizontal spans of above ground outdoor piping shall not be so long as to impose excessive stress on the pipe wall. Unsupported spans shall normally be limited to 20 ft. Longer spans shall be supported by cable or trussing.

(4) Pipe may be located on the exterior side of non-combustible walls if located below windows. It may also be located above roofs of noncombustible construction if satisfactory drainage is arranged to dispose of any leakage.

(5) Where above ground piping crosses roadways or railway sidings, ample overhead clearance and warning signs indicating clearance shall be provided.

(6) Buried piping shall be laid and located so as not to be subjected to stress from building foundations or other facilities subject to vibration or settling. — Buried piping

(7) Buried piping shall be covered with at least 2 ft of well packed earth except as required in sentences (9) and (10).

(8) Buried piping passing alongside buildings or similar structures shall be located at least 1 ft from the foundations except as required in sentence (11).

(9) Pipe passing under roads or driveways shall be laid in an encasing pipe or culvert. The top of the encasing piping or culvert shall be at least 3 ft below the surface of the road or driveway.

(10) Piping to be buried shall be laid in undisturbed soil where possible using clean noncorrosive back-fill. Cinders and the like shall not be used as backfill.

(11) To allow for easy maintenance, piping may be run in split tile ducts underground or in masonry trenches covered with heavy boards or steel plates. In such instances vapour baffles shall be installed to minimize the danger of heavy flammable liquid vapours creeping along the channels and reaching a source of ignition. — Piping in ducts and trenches

(12) Indoor trenches for pipes carrying flammable liquids shall be provided with trapped drains leading to a safe location.

(13) Where piping in indoor trenches contains flammable liquids of Class A the trench shall be provided with positive ventilation or it shall be filled with sand.

(14) Piping shall not be located in service tunnels where a leak or possible fire or explosion might interrupt power or other services or create a serious life hazard. Piping in tunnels

(15) Pipe entrances to buildings shall be located above ground wherever possible and provided with outside control valves at the point of entrance. Where the pipe passes through a wall, a pipe sleeve shall be provided and and the opening shall be sealed with cement grout. Pipe entrances to buildings

(16) If it is necessary for a pipe carrying flammable liquid to pass through a concealed or low space the pipe within the space shall be enclosed in larger pipe. Where the pipe enters the building below grade all nearby openings in the foundation shall be sealed.

(17) Indoor piping may be buried, located in trenches, or supported overhead. Indoor piping

(18) Overhead piping shall be installed close to the ceiling or beams or along walls at least 6 ft above the floor to protect it against mechanical injured. Pipe risers shall be installed inside reinforced concrete columns, alongside of pilasters, between flanges of steel columns or in securely anchored larger pipe. No guard arrangement is normally required if the risers are close to the walls and columns except where they are exposed to mobile equipment.

(19) Pipes carrying flammable liquid shall be supported by approved pipe hangers of such design as to prevent lateral motion of the pipe.

(20) Where possible pipes carrying flammable liquid shall be supported from building framing members.

(21) In buildings of steel frame construction pipes carrying flammable liquid shall be fastened to steel beams or columns by bolted clips or pipe hangers which grip the flanges and have a retaining strap.

(22) Under wood floors, piping carrying flammable liquids shall be securely fastened to supporting members using wood screws, lag screws or bolts.

(23) Under concrete ceilings, through-bolts or expansion shields shall be used. Expansion shields should be used in the horizontal position except in sound concrete having a gravel or crushed stone aggregate. Shields are not permitted in cinder concrete, gypsum or ceilings of similar soft construction.

(24) At least one hanger shall be provided for each length of pipe. Unsupported spans shall not exceed 12 ft for pipe up to 1 1/4 in. diameter or 15 ft for larger pipe.

(25) In the design of flammable liquid piping systems provision shall be made for thermal expansion and contraction by the use of pipe bends, welding elbows or other approved flexible joints. Expansion slip joints are to be avoided as they are subject to leakage. Provisior for expansior and flexibili

(26) Flexible piping shall be used where necessary in systems carrying flammable liquids to prevent the development of dangerous stresses due to vibration, settling or thermal change.

(27) Flexible piping shall be subject to the same requirements as rigid piping with respect to mechanical and thermal properties and resistance to any corrosive action of the liquid. All metal seamless hose or reinforced rubber hose with a synthetic liner and metal braid covering may be used.

(28) Piping systems to carry flammable liquids shall be made up of materials resistant to heat and mechanical damage, chemically resistant to the liquid contained and of adequate design strength to withstand the maximum in service pressures and temperatures. Fragile materials subject to failure from internal stress or from rupture by mechanical damage and combustible or low-melting materials subject to failure even in moderate exposure fires shall not be permitted. Materials for use i piping systems

(29) Where wrought steel or iron pipe is used in a system carrying flammable liquids the pipe including welded and seamless tubing shall meet the requirements of good practice. Wrought steel or iron pipe

(30) Where service pressures from 125 to 300 lb/sq in. will be used in wrought iron or steel piping systems extra heavy duty steel pipe with forged or cast steel or extra heavy malleable screw-type fittings shall be used. For pressures in excess of 300 lb/sq in. pipe and fittings shall be fabricated and installed in accordance with good practice.

(31) Copper tubing and copper or brass pipe may be used subject to the maximum temperature limitations imposed by good practice. It shall not be used where temperatures of over 400°F may be encountered. Copper ar brass pip

(32) Copper tubing and copper or brass pipe used to carry flammable liquid shall be fabricated in accordance with good practice.

(33) Small diameter flexible copper tubing shall be protected against mechanical injury when installed to carry flammable liquids.

(34) Where problems of corrosion, contamination, sanitation or high standards of purity are factors, special piping materials may be used subject to the approval of the authority having jurisdiction. Steel pipe lined with tin, glass, rubber or other material resistant to the liquid being handled may be used. Pipe made from such materials as stainless steel, copper, nickel and aluminum alloys, lead, carbon, graphite, glass, porcelain, thermosetting plastic of high melting point or hard rubber may also be used. Other piping materia

(35) Exposed steel pipe shall either be galvanized or protected with 2 coats of lead and linseed oil base paint or equivalent. Corrosior protect- ion

(36) Buried steel piping shall be protected either by the application of alternate layers of bituminous enamel and asbestos-felt wrapping or by cathodic protection.

(37) Upon completion of the installation all couplings, flanges and bolts shall be coated with bituminous enamel.

(38) All flammable liquid piping shall be coloured yellow. Colour of piping

(39) All piping to be used for carrying flammable liquid shall be pressure tested before being placed in service as described in sentences (43) or (44). Pressure testing

(40) Hydrostatic pressure tests shall be applied where water will cause no difficulty and where the maximum operating pressures are in excess of 1 lb/sq in. The test shall be made at 1 1/2 times the normal operating pressure but not less than 5 lb/sq in. and held for 30 min. If a drop in pressure occurs or any leakage is observed, repairs shall be made as needed and the test repeated.

(41) Air or inert gas pressure tests may be applied where water may cause difficulties or where the normal operating pressure is less than 1 lb/sq in. The test should be made at 1 1/2 times the normal operating pressure but not less than 3 lb/sq in. and held for 30 min. If a drop in pressure occurs, repairs shall be made as required and the test repeated. Soap solutions may be used to detect leaks. Air or inert gas pressure above 10 lb/sq in. shall not be used for testing vessels of appreciable volume.

(42) Screwed joints shall be threaded in accordance with good practice, and a suitable joint compound for the material being handled shall be used to seal the joints. Threaded joints

(43) Welding procedures, welders and welding operators shall follow good practice. Welded joints

(44) Welding of outside transmission lines shall conform to good practice.

(45) Flanged connections shall be provided in welded systems for ease of dismantling so as to avoid subsequent in-place cutting and welding operations.

(46) Flanged joints shall be made using forged or cast steel flanges of the appropiate pressure rating conforming with good practice, except as permitted in sentences (47) and (48). Flanged joints

(47) Bronze flanges in 2-in. and smaller sizes may be used where copper and brass pipe is permitted.

(48) Special flanged joints where used shall have such properties of strength and rigidity as are required by good practice.

(49) Bolting materials for flanged connections shall be of alloy steel conforming to good practice. In existing installations carbon steel and wrought iron bolts may be accepted.

(50) Flanged connections require gaskets of a material which is resistant to the liquid being carried by the piping and which will withstand fire temperatures for a comparable period to the flange and bolts. Spiral-wound or other metallic asbestos-filled gaskets of stainless steel, copper or monel and all-metal zero ring gaskets of dead-soft aluminum, copper or monel should be used. Gaskets

(51) Joints for non-ferrous piping should be threaded, flanged, flared, brazed or silver soldered. Brazing or soldering alloys shall have a minimum melting point of 1000°F. Joints for non-ferrous piping

(52) Valves in piping systems carrying flammable liquids shall be of a type suitable for use with the flammable liquids controlled and have the appropriate service rating for the maximum temperatures and pressures which may be encountered. Valves

(53) Shut-off valves shall be provided in all flammable liquid piping and pumping systems to stop the flow of liquid should a fire occur or liquid accidentally escape. Location of valves

(54) Shut-off valves shall be provided
(a) at connections to supply tanks where transfer of liquid is by other than positive displacement-type pumps,
(b) on supply lines where they enter essential buildings or structures,
(c) on branch lines from the main supply line where supplying equipment in other fire areas, and
(d) on supply lines at dispensing locations.

(55) Check valves shall be installed when the flow of liquid is normally in one direction only and shall be located as close to the source of supply as possible.

(56) Valves should be of the packless or diaphragm type where possible. If conventional-type valves are used the packing and lubrication material shall be of a type resistant to the liquid being carried. Design of valves

(57) Globe valves where used should be arranged so that the packing is on the low pressure side.

(58) Rising stem or other indicating-type valves should be used where it is desirable that it may be readily observed whether they are open or shut.

(59) Valve bodies shall be of cast steel except as permitted in sentences (60) and (61).

(60) Valve bodies may be of bronze for copper or brass pipe in sizes up to 2 in.

(61) When corrosion or product purity is a factor, stainless steel, monel metal or lined-steel bodied valves may be used in systems piping flammable liquids.

(62) Approved automatic shut-off valves shall be installed where necessary in systems piping flammable liquids to protect such equipment as boilers, furnaces, ovens and driers from fire and explosion hazards. — Automatic shut-off valves

(63) Automatic shut-off valves may be electrically or pressure operated. They shall be designed to shut automatically within 5 sec if the holding medium is cut off, and to be manually reset only after the holding medium is applied.

(64) Automatic shut-off valves shall be arranged so that they can be manually shut from a convenient location.

(65) Flammable liquid lines may be steam traced using the minimum steam pressure to make the liquid fluid. A regulator shall be provided in the steam line with a relief valve on the downstream side set at a somewhat higher pressure. The pipe and tracing shall be enclosed with noncombustible insulation. — Heating

(66) Where specific approval is obtained, electrical heating cables may be fastened along the length or wound spirally around the pipe and the whole covered with noncombustible insulation. The cable shall not be spliced and all connections shall be provided with thermostatic controls and protected with fuses or fused disconnect switches having a minimum rating. All electrical devices outdoors shall be located in weather-proof enclosures and as far as practicable from the flammable liquid area.

(67) Where specific approval is obtained thermal electrical conduction methods of pipe tracing may be utilized by passing a low voltage alternating current through the pipe. Such systems shall be installed and tested as complete units. Unheated sections shall be insulated by means of nonconductive fittings. Systems shall be provided with thermostatic controls, high temperature limit controls and protected by fuses or fused disconnect switches. All parts of the piping and fittings shall be enclosed by electrical and thermal insulating covering to prevent accidental grounding of the systems.

(68) Electrical equipment in the vicinity of pumps and ancillary equipment and in any area where vapour-air explosive mixtures may be found shall be of a type suitable for Class 1, Division 2, Hazardous Locations. — Electrical equipment

(69) No special grounding or bonding connections are required for flammable liquid piping as adequate grounding is normally provided by its own connection with the earth. — Static electricity

(70) Where flammable liquids are dispensed through other than closed connections all piping and containers shall be electrically bonded except in the case of Class B flammable liquids and crude petroleum.

(71) The area around outdoor pump sites shall be kept free of dried grass, weeds or vegetation and combustible debris or materials for a distance of not less than 20 ft. — Care and cleanliness

(72) Pump-houses and pump-rooms shall not be used for storage purposes.

(73) Positive displacement pumps shall have a relief valve on the downstream side of sufficient capacity to prevent excess pressure on the system. The relief valve shall be piped to the supply source or to the suction side of the pump. — Transfer by pumping

(74) Check valves shall be installed on the discharge side of the centrifugal pumps to prevent back flow of liquid through the pump.

(75) Pumps shall be designed or equipped so that no part of the system will be subjected to pressures above its allowable working pressure. — Pumps

(76) Pumps installed above grade outside of buildings shall be located not less than 10 ft from lines of adjoining property which may be built upon and not less than 5 ft from any building opening.

(77) Pumps located indoors shall be located in rooms that conform to the requirements of articles 2.1.6.6. except where the design or use of equipment precludes such an arrangement.

(78) Pumps shall be provided with duplicate control switches, one located at the pump and one at a remote location to shut down the pumps in case of emergency.

(79) Pits for subsurface pumps or piping manifolds of submersible pumps shall withstand the external forces to which they may be subjected without damage to the pump, tank or piping. The pit shall be no larger than necessary for inspection and maintenance and shall be provided with a tight-fitting cover. — Pits

(80) Gravity transfer of flammable liquids shall not be used except in the case of very volatile liquids where it may be used to avoid vapour lock difficulties which may be encountered with conventional pumping systems. — Gravity transfer

(81) Hydraulic transfer systems may be used for liquids that are immiscible with water. — Hydraulic transfer

(82) All tanks for hydraulic transfer systems shall be constructed, installed and tested in accordance with provincial regulations. Such systems shall be arranged so that excess water pressure cannot be developed in the tanks or piping. Operating pressures may be controlled by a constant-level float valve or a pressure-reducing valve on the water supply. Systems shall be arranged so that there is no water pressure on the system except when liquid is being discharged. Check valves shall be provided in both water and flammable liquid lines to prevent back flow.

(83) Inert gas transfer systems shall be constructed, installed and tested in accordance with provincial regulations. Pressure regulators shall be provided in the gas line to control the pressure of the gas which should be maintained at the minimum pressure required to force the liquid through the piping system at the rate required. A relief valve shall be provided with a slightly higher setting on the downstream side of the regulator or on the tank. Means of automatically shutting off the gas supply and bleeding the gas pressure in the event of fire shall be provided.

Inert gas transfer

(84) Compressed air transfer systems shall not be permitted.

Compressed air transfer

(85) A portable extinguisher having at least a 20-B classification shall be provided in the vicinity of pumps and ancillary equipment.

Fire protection equipment