NATIONAL FIRE CODE OF CANADA 1963

Issued by the

ASSOCIATE COMMITTEE ON
NATIONAL FIRE CODES

NATIONAL RESEARCH COUNCIL

Ottawa, Canada

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First Edition 1963

The National Fire Code may be obtained by writing to:

The Secretary,
Associate Committee on National Fire Codes,
National Research Council,
Ottawa K1A 0R6 Canada.

PREFACE

This first edition of the National Fire Code of Canada represents the initial attempt under the auspices of the Associate Committee on National Fire Codes to provide Canadian municipalities with a means to constitute a comprehensive fire prevention bylaw.

The Associate Committee on National Fire Codes was established by the National Research Council in 1956 at the request of the Canadian Federation of Mayors and Municipalities, the Association of Canadian Fire Marshals and the Canadian Association of Fire Chiefs. The Associate Committee consists of a group of about twenty Canadian citizens appointed for three-year terms by the Council. They sit on the Committee as individuals and not as representatives of any organization. The major task of the Committee is to further the development of codes of procedure for the establishment, organization and operation of municipal fire departments, and to assist in the promotion of uniformity in local fire prevention and fire protection measures. Continued study and improvement to maintain fire prevention and protection laws which it produces as satisfactory documents which can be conveniently enacted for local use will always be an important part of the Committee's work.

The Associate Committee is generally representative of all the major fire prevention and protection interests in Canada. Its direct responsibility for the preparation and publication of codes ensures the independence of these documents. The staff of the Council are responsible only for the necessary technical and secretarial work, all of which is done to the direction of the Associate Committee.

The actual work of preparing new codes and of revising existing parts is delegated by the Associate Committee to special technical committees. Fire marshals, fire chiefs, municipal managers, fire fighters, union officials, provincial legislative counsels and municipal affairs officials, fire insurance interests and other technical experts sit upon these committees in order that the resulting documents may represent contemporary practice in the fire service in Canada interpreted as necessary to frame the minimum requirements of which the codes consist. These committees always issue drafts of the new documents which they prepare and these are sent for comment to those who express interest in them.

Comments on the use of the codes and suggestions for their improvement will be welcome and may be sent to the Secretary, Associate Committee on National Fire Codes, c/o The National Research Council, Ottawa. If those who use this document will thus co-operate with those who have worked towards its preparation and revision, the true national character of this Code will be maintained and strengthened and their development as satisfactory minimum requirements for use by municipal fire departments and other agencies throughout Canada should steadily progress.

The use of this Code in Canada is commended by the following organizations:

All Canada Insurance Federation
Association of Canadian Fire Marshals
Association of Consulting Engineers of Canada
Canadian Association of Fire Chiefs
Canadian Construction Association
Canadian Federation of Mayors and Municipalities
Canadian Labour Congress
Canadian Underwriters' Association
Engineering Institute of Canada
Royal Architectural Institute of Canada

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A GUIDE TO THE USE OF THE CODE

This Code is drafted in the form of a bylaw so that with the addition of any necessary changes to Part 1, Administration, it may be adopted or enacted for legal use by any municipality in Canada.

The contents are divided into three parts which are the regulatory body of the Code after which are included a number of pages containing advisory reference material.

A consistent numbering system has been used throughout the Code. The decimal system is used to indicate parts, sections, subsections and articles. A sentence which forms an article or part of an article may be subdivided into clauses indicated by (a), (b) etc., and these may be further subdivided into subclauses indicated by (i), (ii) etc.

Where it is necessary to refer to other parts of the Code, the reference has been kept as short as possible. Where a reference is to sentence (1), the reference is to sentence (1) within the same article.

A summary of the arrangement follows:

Part 1. Administration

Part 1 contains those regulations that pertain to the efficient and effective application of the Code. In this Part are defined duties and responsibilities of those concerned. Also included in Part I are the definitions. The terms being defined for the purposes of this Code are identified throughout the Code by their appearance in italic type. Sections of the Code include definitions within the subsection concerned when the term is relative only to that particular subsection. The section containing the definitions in Part 1 lists these specific terms within the alphabetical order of the defined terms and tells where its definition appears in the Code.

Part 2: Requirements Based on Occupancy

Part 2 includes regulations intended to reduce the incidence of fire and protect the public from the effects of fire in general and also to regulate selected occupancies whose existence presents a potential fire hazard.

Part 3: Extreme Hazards

This part includes regulations regarding the storage and handling of materials which are likely to burn with extreme rapidity or which may produce poisonous fumes or gases.

Advisory Reference Material

The Advisory Reference Material provides a guide for procedures to be followed in adopting the Code and also includes the source of technical codes and standards regarded as suitable criteria for what is termed "good practice" in the regulatory parts of the Code. Also included in the Advisory Reference Material is supplementary information regarding the characteristics of hazardous substances and plastics. This information is to be used as a guide when interpreting the requirements of the subsection concerned.

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BYLAW NO._____

For preventing fires, the spread of fire and for the preservation of life

†**THEREFORE the Council of the Corporation of the**_____

of_____**enacts as follows:**

†This preamble relates the Bylaw to enabling legislation and should be adjusted to conform to the powers delegated to the municipality (*see* Advisory Reference Material).

PART 1 ADMINISTRATION

SECTION 1.1 SHORT TITLE

1.1.1. This Code may be cited as the Fire Prevention Bylaw.

SECTION 1.2 APPLICATION

1.2.1. This Code is designed to control — Intent

(a) the use of *buildings*†, the installation of equipment moved into *buildings* in connection with their use and the maintenance of satisfactory conditions for occupant escape and fire fighting, and

(b) *fire prevention* within this municipality.

1.2.2. The *owner*, occupier or lessee upon receiving a notice in writing from the *authority having jurisdiction* will ensure that the *building* described in this notice shall be made to comply with the *building bylaw*[1]* in respect of interior stairways, exterior stairways, fire escapes, hallways, *exit* doors, fire doors and windows, enclosure of stairways, sprinkler systems, standpipes, fire alarms and any other requirements which, in the opinion of the *authority having jurisdiction*, would be necessary for the safety of the occupants of the *building*. — Compliance with building bylaw

SECTION 1.3 ENFORCEMENT

1.3.1. INSPECTION

1.3.1.1. 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 — Inspection for fire hazard

(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.

†Italicized words are defined in Section 1.5.

*Superior number refers to the paragraph so numbered in the Advisory Reference Material.

Right of assistance

1.3.1.2. 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.

Offence

1.3.1.3.(1) Every *person* who is required by article 1.3.1.2. 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) knowingly 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_____

(penalty)

1.3.2. ORDERS

Recommendations and order by inspector

1.3.2.1.(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 propery or both he may make such *order* to ensure 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.

Direction of order

1.3.2.2. 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.

Service of order

1.3.2.3.(1) 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 service of the *order*.

1.3.3. APPEALS

Appeal to provincial authority

1.3.3.1. Any *person* against whom an *order* has been made under this Code may, before the expiration of_____days after the *order* was made, appeal to the provincial fire marshal (com-

missioner) 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.

Appeal to court

1.3.3.2. Where an *order* has been reviewed under sentence 1.3.3.1., any *person* who is interested in the *order* and is dissatisfied with the review or refusal to review may, within_____days after the decision has been made known appeal to a judge of the _____to review the *order* or
(appropriate court)
the decision of the provincial fire marshal (commissioner).

Appeal by motion

1.3.3.3. An appeal under article 1.3.3.2. 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.

Bond or deposit to be filed

1.3.3.4.(1) A *person* appealing under article 1.3.3.2. shall within one week after serving notice of motion under article 1.3.3.3. or within such extended time as the judge may allow

(a) file with the court a bond of an amount not less than _____dollars, to be fixed by the judge, with one or more sureties *approved* by the judge conditioned to pay all of the costs of the appeal if judgement is given against him, or

(b) deposit with the court an amount not less than_____ dollars to be fixed by the judge to cover the costs of the appeal.

Order on appeal

1.3.3.5.(1) 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).

Costs

1.3.3.6. The judge may make such *order* for costs as seems just to him.

Enforcement of judicial orders

1.3.3.7. An *order* made by a judge on appeal to him may be enforced in the same manner as an *order* of the court.

Time of compliance extended

1.3.3.8. 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.

1.3.4. PENALTIES

Punishment of offence

1.3.4.1. Every *person* who contravenes or fails to comply with this Code or who fails to carry out an *order* made under this Code 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 Code is liable on summary conviction to a fine of not less than _____ dollars and not more than _____ dollars or to imprisonment for a term not exceeding _____ or to both such fine and imprisonment and in default of payment of the fine to imprisonment for an additional term not exceeding _____.

Injunction

1.3.4.2. 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 *Chief of the Fire Department* may apply to the _____ or to a (appropriate court) 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.

SECTION 1.4 PERMITS AND LICENCES

1.4.1. GENERAL

Function

1.4.1.1.(1) A *permit* shall constitute permission to maintain, store, or handle materials or to conduct processes which produce conditions hazardous to life or property, or to install equipment used in connection with such activities.

(2) Such *permit* does not take the place of any *licence* required by law.

(3) A *permit* shall not be transferable and any change in use or *occupancy* of a *building* or premises shall require a new *permit*.

Inspection before issue

1.4.1.2.(1) Before a *permit* may be issued the *authority having jurisdiction* will be required to inspect and *approve* the receptacles, vehicles, *buildings* or storage places to be used.

(2) In cases where laws or regulations enforceable by departments other than the responsible authority for *fire prevention* are applicable, joint *approval* shall be obtained from all departments concerned.

Applying for a permit

1.4.1.3.(1) The application for a *permit* shall be made in the form prescribed by the *authority having jurisdiction* and contain at least the following requirements:

(a) the signature of the applicant,

(b) a statement of the intended use of the *occupancy* or operations to be conducted on the premises,

(c) _____ (number) copies of the specifications and scale drawings of the *building* with respect to the use and *occupancy* showing

(i) the dimensions of the *building* and its location,
(ii) the proposed use of each room or *floor area*,
(iii) fire protection installations including *portable extinguishers* as required by this Code, and
(iv) *means of egress*.

1.4.1.4. For every *permit* issued by the *authority having jurisdiction* under the provisions of this Code the fees to be paid shall be those provided for in the bylaw concerned with municipal revenue. — Fees

1.4.1.5.(1) The *authority having jurisdiction* shall issue a *permit* where — Permit issued

(a) an application is made,
(b) the proposed operation or *occupancy* conforms with this Code and any other applicable bylaws, and
(c) the *permit* fee has been paid.

1.4.1.6.(1) The *authority having jurisdiction* may revoke a *permit* or recommend to Council that a *permit* be revoked where there is a violation of — Permit revoked

(a) any condition under which the *permit* was issued, or
(b) any requirements of this Code.

1.4.1.7.(1) This Code shall not be construed to hold the municipality responsible for any damage to *persons* or property by reason of — Liability for damages

(a) inspections authorized by this Code,
(b) the failure to carry out an inspection,
(c) the *permit* issued as herein provided, or
(d) the *approval* or disapproval of any equipment authorized herein.

1.4.1.8. *Permits* and *licences* shall be posted in the premises in a conspicuous place to the satisfaction of the *authority having jurisdiction*. — Posting of permits

1.4.2. PERMITS AND LICENCES REQUIRED

1.4.2.1. A *permit* shall be required for bowling pin refinishing and bowling lane resurfacing operations involving the use and application of *flammable liquids* and materials. — Bowling establishments

1.4.2.2.(1) A *permit* shall be required for — Cellulose nitrate plastics (pyroxylin)

(a) the manufacture of *cellulose nitrate plastics*,
(b) the manufacture or assembly of articles where use is made of *cellulose nitrate plastics*, or
(c) the storing or handling of more than 100 lb of *cellulose nitrate plastics*.

1.4.2.3. A *permit* shall be required to store or keep more than 25 lb of motion picture film, film negatives or plates having a cellulose nitrate base stock. — Cellulose nitrate film

Combustible fibres

1.4.2.4. A *permit* shall be required for the storage and handling of loose *combustible fibres* exceeding 100 cu ft in quantity.

Combustible dusts

1.4.2.5. A *permit* shall be required for the operation of any grain elevator, flour, starch or feed mill, or plant pulverizing aluminum, coal, cocoa, magnesium, spices, sugar, or other material producing *combustible dust* as defined in Section 1.5.

Dry cleaning

1.4.2.6.(1) No *person* shall operate or continue to operate a *dry-cleaning* business without having first obtained from the *authority having jurisdiction a licence* which shall prescribe the location and the class of system to be used.

(2) A separate *permit* and *licence* shall be issued for each separate establishment.

(3) When a *dry-cleaning* business changes ownership, the new *owner* shall, before commencing or continuing to operate the business, obtain a new *licence* from the *authority having jurisdiction.*

Explosives

1.4.2.7.(1) A *permit* shall be required to

(a) possess an *authorized explosive,*

(b) store an *authorized explosive,*

(c) sell an *authorized explosive,*

(d) use an *authorized explosive,* or

(e) transport *authorized explosives* on public highways within the municipality.

(2) The requirements of sentence (1) are not applicable to *small arms ammunition* and construction devices such as explosive rivets and explosive-driven pins or studs.

(3) Before a *permit* to do blasting as required under sentence (1) shall be issued, the applicant for such *permit* shall file a bond deemed adequate in each case by the *authority having jurisdiction,* which bond shall become available in the payment of any damage arising from the neglect of the contractor or his agents or employees.

(4) *Permits* required by sentence (1) shall not be issued

(a) for any *building* or structure that is occupied as a dwelling, school, theatre, or other place of assembly, or

(b) for any *building* or structure that is within 50 ft of any *building* or structure occupied as a dwelling, school, theatre, or other place of assembly, or

(c) where the *building* or structure is lighted by any means other than electricity, or

(d) where any manufacturing processes are conducted, or

(e) where *smoking* sundries are sold.

(5) *Permits* required by sentence (1) shall not be issued for the possession of

(a) liquid nitroglycerine,

(b) dynamite (except gelatin dynamite) containing over 60% of liquid *explosive* ingredient,

(c) dynamite having an unsatisfactory absorbent or an absorbent that permits leakage of a liquid *explosive* ingredient under any conditions liable to exist during storage,

(d) nitrocellulose in a dry and uncompressed condition in quantity greater than 10 lb net weight in one package,

(e) fulminate of mercury in bulk in a dry condition and fulminate of all other metals in any condition except as a component of manufactured articles not hereinafter forbidden,

(f) *explosive* compositions that ignite spontaneously or undergo marked decomposition rendering the products or their use more hazardous, when subjected for 48 consecutive hours or less to a temperature of 167°F,

(g) new *explosives* until *approved* in accordance with the terms of *The Explosives Act* and regulations thereunder,

(h) *explosives* condemned by the *authority having jurisdiction*,

(i) *explosives* not packed or marked in accordance with the regulations of the Board of Transport Commissioners for Canada, or

(j) *explosives* containing an ammonium salt and a chlorate.

(6) *Permits* as required by sentence (1)(b) shall not be issued for a quantity of *explosives* in excess of 50 lb, exclusive of blasting caps, unless special permission is received from the *authority having jurisdiction* as provided in sentence (7).

(7) *Permits* as required by sentence (1)(b) may be issued by the *authority having jurisdiction* in excess of that specified in sentence (6) when blasting operations require greater amounts, but such *permits* shall not be issued for quantities in excess of the amount actually needed for one day's operation and any unused *explosives* shall be returned to a Class A *magazine*.

Fireworks

1.4.2.8. No *person* shall discharge any *fireworks* from any street, lane, square, park, playground, school yard or other public place without a *permit* from the *Chief of the Fire Department*.

Fumigation

1.4.2.9.(1) A *permit* shall be required to maintain a fumigation room, vault or chamber using a toxic or flammable *fumigant*.

(2) No *person* shall engage in the business of fumigation or *thermal insecticidal fogging* without a *licence*.

Generation of acetylene and storage of calcium carbide

1.4.2.10.(1) No *person* shall operate an acetylene generator having a carbide capacity exceeding 5 lb without a *permit*.

(2) No *person* shall store or keep calcium carbide in excess of 200 lb without first obtaining a *permit* to do so.

Hazardous materials

1.4.2.11. A *permit* shall be required for the storage or handling of more than 50 gal of *corrosive liquid*, or more than 500 lb of *oxidizing materials*, or more than 2000 cu ft of flammable *compressed gas*, or any amount of poisonous gas.

Flammable liquids

1.4.2.12.(1) A *permit* shall be required to store, handle or use *Class A flammable liquids* if there is

(a) more than 1 gal in a dwelling or other place of human habitation,

(b) more than 5 gal in any other *building* or other *occupancy*, or

(c) more than 5 gal outside of any *building*.

(2) The requirements of article 1.4.3.11., sentence (1) are not applicable to

(a) the storage or use of *flammable liquids* in the fuel tank of a *motor vehicle*, aircraft, motorboat, mobile power plant or mobile heating plant, or

(b) the storage or use of paints, oils, varnishes, or similar flammable mixtures when such liquids are stored for maintenance painting, or similar purposes for a period of not more than 30 days.

(3) A *permit* shall be required to store, handle or use *Class B flammable liquids* in excess of 20 gal in a *building*, or in excess of 50 gal outside of a *building*, except for fuel oil used in connection with oil-burning equipment and stored in *approved* tanks.

(4) A *permit* shall be required to process, blend or refine *flammable liquids*.

(5) A *permit* shall be required to store *flammable liquids* in stationary tanks except as permitted by sentence (3).

Lumber storage

1.4.2.13. A *permit* shall be required in order that a *person* may store in excess of 100,000 bd ft of lumber.

Matches

1.4.2.14.(1) A *permit* shall be required to manufacture matches.

(2) No *person* shall store matches exceeding in aggregate 25 cases of matches without a *permit*.

Plastics manufacturing or fabricating

1.4.2.15. A *permit* shall be required for the operation of a plastics manufacturing or fabricating plant storing, handling or using plastics materials categorized in Flammability Groups C or D in Table A-1 included in the Advisory Reference Material.

Public garages

1.4.2.16. No *person* shall use any *building*, shed or enclosure as a public *garage* without a *permit*.

Radioactive material

1.4.2.17.(1) No *person* shall store or use *radioactive materials* for which a *licence* is required by the Atomic Energy Control Act of the Government of Canada unless a *permit* to do so has been obtained from the municipality.

(2) Every application for a *permit* to use or store *radioactive materials* shall be accompanied by a statement giving the location where the *radioactive material* is to be used or stored including

(a) the number of individual radioactive *sources*,

(b) the kind of *source* and the radiation emitted,

(c) whether the *source* is sealed or not sealed,

(d) whether the *source* is metal, powder or liquid,

(e) the radiation level of the unshielded *source* and the shielded *source*, and

(f) the name and qualifications of the *person* who is in charge.

Refineries, chemical plants and distilleries

1.4.2.18.(1) A *permit* shall be required for the establishment within the limits of the municipality of

(a) a *refinery*,

(b) a plant for storing or handling *crude petroleum*,

(c) a chemical plant handling large volumes of *flammable liquids*, or

(d) a distillery.

(2) No *permit* shall be issued until *approval* of the *authority having jurisdiction* has been given for the proposed location with respect to topography, nearness to places of assembly, residential or mercantile *occupancies* and adequacy of water supply for fire control.

Salvage shops or salvage yards

1.4.2.19.(1) No *person* shall operate or maintain a salvage shop or salvage yard unless he has in his possession a *permit* issued by the municipality.

(2) Each *permit* for a salvage shop or salvage yard or the collection within the municipality of *second-hand goods* shall be accompanied by

(a) a statement on the form provided by the *authority having jurisdiction* stating the following particulars:

(i) location of the premises,

(ii) size of the premises,

(iii) a description of existing *buildings* on the premises,

(iv) a list of the materials which it is proposed to receive, sell or store,

(b) a certificate signed by the *Chief of the Fire Department* certifying that he has inspected the *buildings* and premises in respect to which the application is made and he has found that they are in accordance with this Code, and

(c) a certificate signed by an *inspector* for the *authority having jurisdiction* certifying that the operation of the salvage yard in the location applied for is *approved* and that the *buildings* and premises are satisfactory.

Welding and cutting

1.4.2.20.(1) A *permit* shall be required for each company, corporation, co-partnership or owner-operator performing *welding* or *cutting* operations.

(2) Application for a *permit* required by this article shall be made by the company, corporation, co-partnership or owner-operator performing the *welding* or *cutting* operation or by his duly authorized agent.

(3) A *permit* for *welding* or *cutting* operations shall not be issued unless the individuals in charge of performing such operations are capable of doing such work in a safe manner.

(4) Companies, corporations, co-partnerships and owner-operators required to have a *permit* shall maintain a record of all locations where *welding* or *cutting* operations are performed, and have it available for inspection by the *authority having jurisdiction.*

SECTION 1.5 DEFINITIONS

Approval means the official endorsation of the *authority having jurisdiction.*

Approved means that the design, manufacture, installation or intended use of any equipment, device, structure or part thereof as required by this Code is acceptable to the *authority having jurisdiction.**

Authority having jurisdiction means the Municipal Council or with respect to the regulation of *buildings*, the building inspector; with respect to *fire prevention* regulations, the *Chief of the Fire Department;* where the term appropriate *authority having jurisdiction* is used it means the responsible provincial officials with legal authority for controlling potentially hazardous situations and matter: provincial fire marshals, gas inspectors, officers of provincial departments of labour, etc., in consultation with municipal building inspectors and *fire chiefs.*

Authorized explosive means an *explosive* that is acceptable to the Chief Inspector of Explosives of the Department of Mines and Technical Surveys of the federal government and is declared by the Minister of that Department to be an *authorized explosive.*

Auto-ignition temperature means the lowest temperature of a substance, whether solid, liquid or gaseous, that is required to initiate or cause self-sustained combustion in the absence of a spark or flame.

Barrel means a volume of 35 imperial *gallons.*

*Devices having been tested in accordance with recognized standards and accepted for a specific purpose by a nationally *recognized testing laboratory* may be deemed to be those generally acceptable to *authorities having jurisdiction.*

Basement means that portion of a *building* between 2 floor levels which is partly underground but which has at least one half of its height from finished floor to finished ceiling above adjacent finished grade.

Bowling alley means any *building* or portion thereof erected or used for the operation of one or more *bowling alleys* where the use is accessible to the public, whether for gain or entertainment only.

Building means a structure enclosed within exterior walls or fire walls, built, erected and framed of component structural parts designed for the housing, shelter enclosure and support of individuals, animals, or goods of any sort.

Building bylaw means the lawful regulations of a municipality which are adopted for the control of construction, alteration, repair, moving and demolition of *buildings* having regard for the safety of the public from structural, health and fire hazards.

Bulk plant means that portion of a property where *flammable liquids* are received by tank vessel, pipe-line, 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 or other container.

Cellar means that portion of a *building* between 2 floor levels which is partly or wholly underground and which has more than one half of its height from finished floor to finished ceiling, below adjacent finished grade as *approved.*

Cellulose nitrate motion picture film means any recording film coated on a support or base consisting essentially of cellulose nitrate and including film commonly known as nitrate film.

Cellulose nitrate plastics (pyroxylin) means any plastics substance, material or compound, by whatever name known and in any shape or form, having cellulose nitrate as a base.

Chief of the Fire Department (*Fire Chief*) means the person appointed from time to time by bylaw or resolution of the Council of the municipality to be the officer responsible for the operation of the municipal fire department.

Chimney means a primarily vertical shaft which encloses one or more *chimney flues,* these being of three principal types:

(a) a field-constructed *chimney* of brick, stone, concrete or *approved* masonry units,

(b) a factory-built *chimney* consisting entirely of factory-constructed parts each designed to be assembled with the others without requiring field construction,

(c) a field-constructed single-walled *chimney* of metal (smokestack).

Chimney connector means the flue pipe of a heat-producing unit burning solid or liquid fuel.

Chimney flue means a flue contained in a *chimney* or *chimney liner.*

Chimney liner means a refractory or *approved* metal conduit containing a *chimney flue* used as a lining of a masonry or concrete *chimney.*

Class A extinguisher means a *portable extinguisher* for extinguishing *Class A fires.*

Class B extinguisher means a *portable extinguisher* for extinguishing *Class B fires.*

Class C extinguisher means a *portable extinguisher* for extinguishing *Class C fires* where electrical nonconductivity of the extinguishing medium is of first importance.

Class A fire means a fire involving ordinary *combustibles* such as wood, cloth, paper or other such *combustible* matter.

Class B fire means a fire involving a *flammable liquid*, fat, or grease.

Class C fire means a fire involving energized electrical equipment.

Class A flammable liquid means a *flammable liquid* having a *flash point* at or below 80°F.

Class B flammable liquid means a *flammable liquid* having a *flash point* above 80°F.

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

Combustible (as pertaining to materials adjacent to or in contact with heat-producing units venting equipment, pipes and ducts) means materials made of or surfaced with wood, compressed paper, plant fibres or other material that will ignite and burn, whether or not such material be flame-proofed, fire retardant, treated or plastered.

Combustible dusts means dusts and particles whether metallic or non-metallic, ignitable and liable to explode, including among others those resulting from the handling or processing of grain, malt, and the manufacturing of flour and feed.

Combustible fibres and shredded material means finely divided *combustible* vegetable or animal fibres and thin sheets or flakes of such materials which in a loose, unbaled condition present a flash fire hazard, including among others cotton, hemp, sisal, jute, kapok, paper, and cloth in the form of scraps and clippings.

Compressed gas means any mixture or material having in the container either an absolute pressure exceeding 40 lb/sq in. at 70°F, or an absolute pressure exceeding 104 lb/sq in. at 130°F, or both; or any *flammable liquid* material having an absolute *vapour pressure* exceeding 40 lb/sq in. at 100°F.

Corrosive liquid means an acid or an alkaline caustic liquid or any other liquid which when in contact with living tissue will cause severe damage of such tissue by chemical action, or

which when in contact with organic matter or with certain chemicals is liable to cause fire.

Crude petroleum means hydrocarbon mixtures that have a *flash point* below 150°F. and which have not been processed in a refinery.

Curie – defined in subsection 3.2.9.

Decorative material means all such materials as curtains, draperies, streamers, surface coverings applied over the *building* interior finish for any purpose and also cloth, cotton batting, straw, vines, leaves, trees and moss used for decorative effect, but does not include floor coverings and ordinary window shades.

Dip tank means a tank, vat or container of *flammable liquid* in which articles or materials are wholly or partially immersed for the purpose of coating, finishing, treating or for similar purposes.

Dispensing apparatus (for *flammable liquid*) means a device or system of devices used in connection with an underground tank, above ground tank or portable tank for the dispensing of *flammable liquids* into the fuel tanks of *motor vehicles* at or in connection with an automotive service station or a *bulk plant.*

Dry cleaning means the process of using non-aqueous liquid solvents, flammable or non-flammable, for the removal of dirt, grease, paints or other stains from wearing apparel, textiles, fabrics, rugs, etc., by:

(a) immersion and agitation in open vessels,

(b) immersion and agitation in closed machines, or

(c) spotting, brushing and scouring.

Dry dyeing means the process of dyeing clothes or other fabrics or textiles, by immersion or spraying, with a solution of dye colours in non-aqueous liquid solvents.

Exit means that part of a *means of egress* which leads from the *floor area* it serves, including any doorway leading directly from a *floor area* to another *floor area,* a public thoroughfare or an *approved* open space.

Exit (access to) means that part of a *means of egress* within a *floor area* which provides access to an *exit* serving the *floor area.*

Exit (horizontal) means the connection by a bridge, balcony, vestibule, or doorway of 2 *floor areas* at substantially the same level; such *floor areas* being located either in different *buildings* or located in the same *building* and fully separated from each other.

Explosive means any chemical compound or mechanical mixture that

(a) is commonly used or intended for the purpose of producing an explosion, and

(b) contains any oxidizing and *combustible* units or other ingredients in such proportions, quantities, or packing that an ignition by fire, friction, concussion, percussion,

or detonator of any part of the compound or mixture may cause such a sudden generation of highly heated gases that the resultant gaseous pressures are capable of producing destructive effects on contiguous objects or of destroying life or limb.

Explosives Act means The Explosives Act, Chapter 102 of the Revised Statutes of Canada 1952, as amended by Chapter 14 of the Statutes of Canada 1953-1954, and other amendments to The Explosives Act.

Extinguishing potential means the assessed capability of various classes of fire extinguishing equipment to extinguish a fire.

NOTE: Underwriters' Laboratories of Canada classify portable extinguishers according to the class of fire to be extinguished and give them a rating determined by physical testing. Letters A, B, or C denote the class of fire on which the extinguisher is to be used and a numeral connotes the following:

(a) in the case of *Class A extinguishers* the numeral is indicative of the approximate relative fire *extinguishing potential* of various size *Class A fire extinguishers*, i.e., a 4-A extinguisher can be expected to extinguish approximately twice as much fire as a 2-A extinguisher,

(b) in the case of *Class B extinguishers* the numeral is also indicative of the approximate relative fire *extinguishing potential* of various size *Class B extinguishers*, and in addition, the numeral is an approximate indication of the square-foot area of deep-layer *flammable liquid* fire which an average operator can extinguish, i.e., a 10-B unit can be expected to extinguish 10 sq ft of deep-layer *flammable liquid* fire when used by an average operator, and

(c) in the case of *Class C extinguishers* no numeral is used since *Class C fires* are essentially either *Class A* or *Class B fires* involving energized electrical wiring and equipment. The size of the *Class C extinguisher* installed should be commensurate with the size and extent of the area involving the electrical hazard or containing equipment being protected considering that it must be covered or blanketed by the Class C extinguishing media for effective fire extinguishment.

Finishing room — see *Spray room* defined in subsection 3.2.8.

Fire prevention means measures instituted for the purpose of reducing the loss of life and property by fire.

Fire protection equipment (in *buildings*) means, but is not limited to, any one or more of the following:

(a) temporary standpipe system,

(b) permanent standpipe system,

(c) sprinkler system, and

(d) portable hand extinguishing equipment.

Fire resistance rating means the rating assigned to any element or assembly of materials which has been tested in accordance with standard methods of test.[46*]

*Superior number refers to the paragraph so numbered in the Advisory Reference Material.

Fire separation means a barrier against the spread of fire in the form of construction specified by the municipal *building bylaw.*

Fireworks – defined in subsection 3.2.2.

Fireworks composition – defined in subsection 3.2.2.

Flame arrestor means any *approved* device which functions effectively to prevent the passage of flame.

Flammable liquid means any liquid having a *flash point* below 200°F and of which the pressure of the vapour does not exceed 40 lb/sq in. (absolute) at 100°F.

Flammable substance means a substance, other than one classified as an *explosive,* which is liable to cause fires through friction, absorption of moisture, spontaneous chemical changes, or as a result of retained heat from manufacturing or processing.

Flash point means the minimum temperature in degrees Fahrenheit at which a *flammable liquid* will give off sufficient flammable vapour to form a flammable mixture with air that will ignite momentarily upon the application of a test flame as determined by appropriate test procedure and apparatus specified.

Floor area means an area of any floor or storey of a *building* which is occupied, or intended for *occupancy. Floor areas* shall not be considered as including *exits* or attic, crawl, or duct spaces except as permitted in the municipal *building bylaw.*

Fumigant means a substance or combination of substances which emits or liberates a gas, fume or vapour used for the destruction or control of insects, fungi, vermin, germs, rodents or other pests, and shall be distinguished from insecticides and disinfectants which are essentially effective in the solid or liquid phases.

Gallon means an imperial gallon of 160 fluid ounces unless otherwise qualified, e.g., United States gallon (liquid measure containing 128 fluid ounces) is qualified by the abbreviation (U.S.).

Garage means any *building* where facilities are provided for repairing, servicing or storing *motor vehicles.*

Hazardous location means a location which is or may become subject to conditions conducive to the rapid development of fire or explosion.

Hazardous substance means a substance which, because of its physical or chemical nature or because of the form in which it exists, may explode or become ignited easily and cause intense fires.

Hotel means a *building* or part thereof wherein accommodation is provided for transient lodgers, without private cooking facilities but having a public dining room or café.

Inspector means the *Chief of the Fire Department* or other officer or person designated as *inspector* by the Council.

Licence (occupational) means a document issued to an individual to attest to his having met a minimum standard of competence in some trade or occupation.

Liquefied petroleum gases means propane, butane and other petroleum gases normally stored in a liquid state under pressure.

Magazine means any *building* or structure used for the storage of *explosives.*

Manufactured fireworks – defined in subsection 3.2.2.

Marine service station means that portion of a property where *flammable liquids* used as motor fuels are stored and dispensed on shore, piers, wharfs, or barges into the fuel tanks of floating craft, and shall include all facilities used in connection therewith.

Means of egress means a doorway, hallway, corridor, lobby, stair, ramp or other facility or combination thereof provided for the escape of *persons* from a *building, floor area,* or room to a public thoroughfare or other *approved* open space; *means of egress* include *exits* and access to *exits.*

Microcurie – defined in subsection 3.2.9.

Millicurie – defined in subsection 3.2.9.

Motel means a *hotel* with *exits* leading directly to the outside and with each *exit* serving not more than 2 continuous rental units.

Motor vehicle means a truck, automobile or any other vehicle propelled or driven by other than muscular power, but does not include traction engines or electric or steam railway cars or *motor vehicles* running only upon rails, to which the Railway Act applies.

Noncombustible as applied to a *building* construction material means a material that has been classed as *noncombustible* by means of a standard test procedure.[47]*

Noncombustible receptacle means a container which is constructed of materials that will not support combustion and that have a high resistance to heat softening. The container shall have a close-fitting metal lid or cover that shall be kept on the receptacle at all times.

Nursing homes – defined in subsection 2.2.3.

Occupancy means the use or intended use of a *building* or structure or part thereof for the shelter or support of *persons,* animals or goods.

Occupancy (major) means the principal *occupancy* for which a *building* or part of a *building* is used or intended to be used, for the purposes of the classification of *buildings* according to *occupancy;* a *major occupancy* shall be deemed to include the subsidiary *occupancies* which are contingent upon it.

Order means an authoritative direction requiring compliance with lawful regulations or bylaws.

Owner means any *person,* firm, corporation or agent controlling the property under consideration.

*Superior number refers to the paragraph so numbered in the Advisory Reference Material.

Oxidizing material means an oxygen-carrying substance that reacts with *combustible* materials explosively or with the evolution of heat.

Permit means a document giving authorization to carry on hazardous processing or to use hazardous materials if certain specified conditions are adhered to.

Person means an individual, or a body of persons or in a wider sense an aggregate of property that is recognized by law as the subject of rights and duties.

Place of outdoor assembly means all premises used or intended to be used for public gatherings of 200 or more *persons*, other than *buildings* used as a place of assembly, and shall include the following: amusement parks, athletic fields or bowls, automobile speedways, aviation shows, bandstands, baseball parks, bathing establishments, beach enclosures, bleachers, concession booths, grandstands, observation platforms, race tracks, reviewing stands, rodeos, skating rinks, stadia, swimming pools, tents for circuses, carnivals, and religious, educational or recreational purposes or public meetings.

Portable extinguishers (first-aid fire extinguishing equipment) means fire extinguishing equipment and devices that are portable in their entirety and does not apply to permanently installed systems for fire extinguishment even though portions of such systems are portable.

Processing plant (*flammable liquid*) means that portion of a property in which *flammable liquids* are mixed, heated, separated or otherwise processed as principal business, but shall not include plants defined herein as *refineries*.

Radioactive material – defined in subsection 3.2.9.

Recognized testing laboratory means a laboratory acceptable to the *authority having jurisdiction*.

Refinery means a plant in which *flammable liquids* are produced on a commercial scale from *crude petroleum*, natural gasoline, or other hydrocarbon sources.

Safety can means an *approved* container having a spring-closing spout cover and a capacity of not more than 5 gal.

Second-hand goods includes waste paper, rags, bones, bottles, automobile tires, old metal and other scrap material and salvage.

Service station – defined in subsection 2.3.12.

Shop goods – defined in subsection 3.2.2.

Small arms ammunition means cartridges for any shotgun, rifle, pistol, or revolver.

Smoking means the use and disposal of burning tobacco in any form.

Source (radioactive)–defined in subsection 3.2.9.

Spotting means the local application of solvents to remove spots of dirt, grease, paints or other stains.

Spraying area – defined in subsection 3.2.8.

Spray booth – defined in subsection 3.2.8.

Spray room – see *Finishing room* defined in subsection 3.2.8.

Tank vehicle means any vehicle other than railroad tank cars and boats, with a cargo tank mounted thereon or built as an integral part thereof used for the transportation of *flammable liquids* including self-propelled vehicles, full trailers and semi-trailers without motive power with wheels carrying either part or all of the load.

Tent means a shelter or structure the covering of which is made of pliable material.

Thermal insecticidal fogging means the use of insecticidal liquids which are passed through thermal fog generating units where they are, by means of heat, pressure and turbulence, transformed and discharged in the form of a fog or mist that is blown into an area to be treated.

Tire means a natural or synthetic rubber hoop or band forming the tread of a vehicle wheel, which may be either of a solid or pneumatic type.

Tire converting means any process or operation whereby *tires* are converted or altered.

Tire rebuilding means any process of retreading, recapping, or vulcanizing, cementing or molding *tires*.

Tire storage warehouse means a *building* or premises used primarily for the storage of *tires* where the quantity of *tires* stored exceeds 15,000 cu ft in one fire division.

Vapour area means any area containing dangerous quantities of flammable vapours.

Warehouse means any *building* used as a storehouse for the safekeeping of merchandise.

Welding and *cutting* means and includes gas, electric arc, or *flammable liquid welding* or *cutting* or any combination thereof.

PART 2 REQUIREMENTS BASED ON OCCUPANCY

SECTION 2.1 GENERAL REQUIREMENTS

2.1.1. SCOPE

2.1.1.1. Part 2 of the Code includes regulations intended to reduce the incidence of fire and protect the public from the effects of fire in general and also to regulate selected *occupancies* whose existence presents a potential fire hazard.

2.1.1.2. *Major occupancy* classification is provided in order that general fire protection requirements can be more readily assessed and provided for.

2.1.1.3. Regulations pertinent to *building* construction are recognized as being the jurisdiction of the *building bylaw*.

2.1.2. CLASSIFICATION OF BUILDINGS BY MAJOR OCCUPANCIES

Classification required by major occupancy

2.1.2.1.(1) Every *building* or other structure or part thereof whether existing or hereafter erected shall be classified by the *authority having jurisdiction* on the basis of its *major occupancy* in accordance with the system of classification contained in article 2.1.2.2.

More than one major occupancy in same building

(2) Where it is intended to use a *building* for more than one *major occupancy* the *building* shall be classified according to all *major occupancies* that occupy the *building*.

2.1.2.2. MAJOR OCCUPANCY CLASSIFICATION

Group A Buildings — Assembly

	Division 1
Theatres	Motion picture theatres
	Division 2
Auditoria	Libraries
Bowling alleys	Lodge rooms
Churches	Museums
Community halls	Nonresidential club *buildings*
Court rooms	Nonresidential college *buildings*
Dance halls	Nonresidential school *buildings*
Exhibition *buildings*	Passenger stations and depots
Gymnasia	Recreation piers
	Division 3
Arenas	Exhibition *buildings* (arena type)
Armouries	Public swimming baths
Curling rinks	Skating rinks

Division 4

Amusement park structures (not classified elsewhere)
Bleachers
Grandstands
Reviewing stands
Stadia

Group B Buildings — Institutional

Division 1

(*Buildings* principally used by persons whose liberty is restricted.)

Jails
Prisons
Psychiatric hospitals
Police stations
Reformatories

Division 2

(*Buildings* principally used by persons whose actions are restrained because of age or physical limitations.)

Children's shelters
Hospitals
Infirmaries
Nursing, convalescent and rest homes
Old people's homes
Orphanages
Sanatoria

Group C Buildings — Residential

Division 1

(*Buildings* used for the shelter and sleeping accommodation of persons, excluding one- and two-family dwellings and those classified as institutional *buildings*.)

Apartment houses
Convents
Dormitories
Fire Stations (incorporating sleeping quarters)
Hotels and *motels*
Lodging houses
Monasteries
Residential clubs
Residential colleges
Residential schools

Division 2

Detached, semi-detached, duplex, semi-detached duplex houses and row housing.

Group D Buildings — Business and Personal Services

Barber shops and hairdressing establishments
Beauty parlors
Dental offices
Fire stations (no sleeping quarters)
Medical offices
Office *buildings*
Restaurant *buildings*
Undertaking premises

Group E Buildings — Mercantile

Retail stores

Group F Buildings — Commercial and Industrial

Division 1 – High Hazard

(*Buildings* in which the *occupancy* involves sufficient quantities of highly *combustible* and flammable or *explosive* material, and that due to their inherent characteristics constitute a special fire hazard.)

Bulk storage *warehouses* for *hazardous substances*
Cereal and flour mills
Chemical or other plants involving *hazardous substances*
Distilleries
Dry-cleaning plants (employing *flammable liquids*)
Grain elevators
Paint, varnish and pyroxylin product factories
Rubber plants

Division 2 – Moderate Hazard

(*Buildings* for *occupancies* with fire loads of more than 10 lb/sq ft.)

Box factories
Candy plants
Cold storage plants
Electrical substations
Laboratories
Laundries
Loft and *warehouse buildings* (containing largely *combustible* stores)
Mattress factories
Planing mills
Printing plants
Repair garages and *service stations*
Woodworking factories

Factories
Loft *buildings*
Salesrooms
Storage rooms
Wholesale stores
Workshops
} Involving the manufacture, use or storage of *combustible* goods not elsewhere classified

Dry-cleaning plants (employing no flammable or explosive solvents or cleaners)

Division 3

(*Buildings* for *occupancies* with a fire load of 10 lb/sq ft or less.)

Factories
Workshops
} using *noncombustible* and non-explosive materials

Salesrooms
Storage rooms
} for *noncombustible* and non-explosive materials

Creameries
Open sheds
Private barns
Private stables
Power plants (excluding substations)
Private *garages*
Storage *garages*

Detached, one-storey, non-business *buildings* used only to house not more than 10 non-commercial *motor vehicles* or 2 such vehicles and 3 commercial vehicles.

2.1.3. ALTERATIONS IN BUILDING STRUCTURES

Building alterations

2.1.3.1. Alterations to any *building* necessitated by compliance with the requirements contained in this Code shall be in accordance with the *building bylaw*.[1]*

2.1.4. COMMON FIRE HAZARDS

Removal of hazardous material

2.1.4.1. Whenever in any *building* or premises there exists any *flammable*, *combustible* or *explosive* material or *substance*, or any dangerous or unnecessary accumulation of waste materials or litter or vegetation of a nature especially liable to fire, and those materials are so situated, in the opinion of the *inspector*, as to endanger life or property or to obstruct ingress to or egress from the *building* in case of fire, or which may be liable to interfere with the operations of the fire department, or where any other condition exists which is considered by the *inspector* to be a fire hazard, the occupant of the *building* or premises shall forthwith (on the *order* of the *inspector*) have the *flammable*, *combustible* or *explosive* material or *substance*, or the accumulation of waste materials or litter removed, disposed of or otherwise dealt with in accordance with the *order*.

Vacant buildings

2.1.4.2. The *owner* of any vacant *building* in the municipality shall at all times ensure that the premises are free from debris and *flammable substances* and shall keep all openings in such a *building* securely closed and fastened so as to prevent the entry of unauthorized *persons*.

Fire doors

2.1.4.3.(1) Where doors or shutters are installed in a *building* to prevent the spread of fire those doors or shutters inclusive of hardware shall at all times be kept and maintained in good repair and working order.

(2) Doors or shutters installed to prevent the spread of fire shall not be blocked or wedged open.

Elevator shafts

2.1.4.4.(1) No *person* shall store, place, maintain or permit to be stored, placed, kept, or maintained in any part of an elevator shaft in a *building* any *flammable*, *combustible* or *explosive* material or *substance*.

(2) The well of an elevator shaft shall at all times be kept clean and free from rubbish and litter and other unnecessary *flammable substances*.

Ventilating shafts

2.1.4.5. No *person* shall use a ventilating shaft for a purpose other than that intended.

Chimneys, flues and vents

2.1.4.6.(1) The *owner* of a *building* or premises shall cause every *chimney flue* and *chimney connector* to be cleaned of all accumulation of debris as often as may be necessary to keep the *chimney* and *chimney connector* free from danger of fire.

*Superior number refers to the paragraph so numbered in the Advisory Reference Material.

(2) Every pipe or thimble hole in a *chimney* shall be closed with a tight-fitting ferrous metal stove-pipe or stopper.

(3) Every hood, vent and pipe over or leading from a range, oven, or other similar device or fixture shall be kept clean and free from grease and dirt.

(4) A stove-pipe shall discharge into *approved chimneys* or smokestacks.

(5) A *chimney*, flue or stack, and any metal extension thereof shall be maintained in a safe condition.

Flammable drippings

2.1.4.7. No *person* shall use or employ in a *building* sawdust, shavings or other *flammable substance* or material, whether of the foregoing kind or not, for the purpose of catching, holding or absorbing drippings from oil barrels or other receptacles holding *flammable substances* or materials.

Disposition of combustible material

2.1.4.8.(1) No *person* shall deposit or permit to be deposited any greasy or oily rags or other things liable to spontaneous heating, within 3 ft of a *combustible* wall, partition, fence, floor or sidewalk or within 3 ft of lumber, hay, shavings, rubbish, fuel or other *combustible* or flammable materials, unless those rags or other things are deposited in a *noncombustible receptacle.*

(2) An occupant of a *building* or premises who makes, stores or uses shavings, excelsior, rubbish, sacks, bags, litter, hay, straw, waste-paper or other *combustible* or flammable material shall, at the close of each day, compactly bale or stack such material in a safe manner or store it in *noncombustible receptacles.*

Disposal of ashes

2.1.4.9.(1) No *person* shall deposit or allow or cause to be deposited ashes from a fire box or ash pit within 3 ft of a *combustible* wall, partition, fence, floor, or sidewalk or within 3 ft of lumber, hay, shavings, rubbish fuel or *combustible* material.

(2) All ashes shall be deposited in a *noncombustible receptacle.*

(3) No *person* shall deposit or allow or cause to be deposited paper, straw, hay, shavings or other *combustible* or flammable matter in or among ashes or other matter taken from a stove, furnace or fireplace.

Noncombustible receptacles

2.1.4.10.(1) A *noncombustible receptacle* for the storage of *combustible* matter similar to that mentioned in article 2.1.4.8. and defined in Section 1.5 shall be

(a) placed on stands or legs that will not support combustion and not less than 3 in. high if the flooring material upon which it is placed is *combustible*, and

(b) placed not less than 1 ft from a *combustible* wall, partition, fence, or sidewalk and shall not be within 1 ft of lumber, hay, shavings, rubbish, fuel or other *combustible* or flammable material.

Starting fires in open air

2.1.4.11.(1) 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 without first having obtained a written *permit* to do so from the *Fire Chief*.

(2) A *person* to whom a *permit* has been so issued under sentence (1) shall place and keep a competent *person* at all times in charge of the fire while it is burning or smouldering 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.

(3) This regulation does not apply to small confined fires used to cook food in grills and barbecues.

Portable incinerator

2.1.4.12.(1) A portable incinerator or other portable device or appliance for burning garbage, rubbish or other waste material shall not 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 Chief*.

(2) An appliance or device referred to in sentence (1) shall be equipped with proper spark-arresting attachments and such other safeguards, if any, as shall be prescribed by the *Fire Chief*.

Flammable gas in balloons

2.1.4.13. No *person* shall use or allow the use of flammable gas for the inflation of a balloon or other device whether indoors or outdoors.

Smoking

2.1.4.14.(1) Where conditions are such as to make *smoking* a hazard, the *authority having jurisdiction* shall order the *owner* in writing to post *approved* NO SMOKING signs where *smoking* shall be prohibited, and shall designate specific safe locations in which *smoking* may be permitted.

(2) It shall be unlawful for any *person* to remove any legally required NO SMOKING sign or to smoke in any place where such signs are posted.

Electrical installations

2.1.4.15. The minimum requirements for all electrical equipment, installation and wiring in any *building* or on any premises shall be in accordance with the provincial electrical regulations.

2.1.5. MAINTENANCE OF EXIT WAYS

Scope

2.1.5.1. Requirements for *exits* and types and *means of egress* are found in the *building bylaw*.[1]* The *owner* is responsible to see that all *exits* and *means of egress* are to be maintained safe for use in the event of a fire on the premises and that these regulations provide for a safe *exit*.

Obstructions to means of egress

2.1.5.2.(1) The *means of egress* from each part of a *building*, including stairways, fire escapes, *exit* doors and any panic hardware installed thereon, aisles, corridors, passageways and similar paths

*Superior number refers to the paragraph so numbered in the Advisory Reference Material.

of *exit* travel, shall at all times be maintained in safe condition and shall be available for immediate use and free of all obstructions.

(2) No *person* shall hinder or obstruct the self-closing operation of doors separating stair enclosures from the remainder of the *building*.

(3) Locks or fastenings to prevent free escape from the inside of a *building* shall not be installed except in mental, penal or other institutions where security of inmates is necessary, in which case supervisory personnel shall be continually on duty and effective provisions made to remove occupants in case of fire or other emergency.

Storing explosive or flammable material near exits

2.1.5.3. No *person* shall place, store or keep or allow to be placed, stored or kept on, under or at the bottom of an *exit*, stairway, elevator, fire escape or other *means of egress* any *combustible* or flammable material.

Lighting

2.1.5.4. In every *building*, artificial illumination shall be provided so that all *means of egress* are illuminated at all points, such as angles and intersections of corridors and passageways, stairways, landings of stairs, and *exit* doorways, to levels of not less than 1.0 ft-candle except that in auditoria and other places of assembly where pictures, motion pictures or other projections are made by means of directed light the illumination of the floors of *means of egress*, may be reduced during such period of projection to levels of not less than 0.2 ft-candle. At other times the full level of illumination is required.

Exit signs

2.1.5.5. *Exit* signs shall be maintained in a clean and legible condition and shall be clearly illuminated and kept lit at all times that the *building* is occupied.

Exit lights

2.1.5.6. All *exit* lights shall be kept burning when the premises are occupied during the hours of darkness or during periods when the *exit* is not clearly visible.

Mirrors prohibited

2.1.5.7. No mirrors shall be placed in or adjacent to any *exit* in such a manner as to confuse the direction of *exit*.

2.1.6. FLAMMABLE LIQUIDS

Scope

Application

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.

Heated Class B flammable liquids

(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*.

High flash point 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.

Liquefied petroleum gas

(4) The storage and handling of *liquefied petroleum gases* shall be in accordance with provincial regulations.[2]*

Acceptability of containers, tanks and equipment

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.

Flash point

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.*[3]*

(2) Fuel oils and gas oils shall be determined in accordance with a standard method of test for *flash point.*[4]*

(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.*[4]*

Warning labels

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.

(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

Signs to be posted

2.1.6.5.(1) Signs indicating the presence of *flammable liquids* particularly those of *Class A* shall be conspicuously posted

(a) on storage cabinets for *flammable liquids*,

(b) outside of storage rooms for *flammable liquids*, and

*Superior number refers to the paragraph so numbered in the Advisory Reference Material.

(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

Storage buildings and rooms containing flammable liquids

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.

More than 10 gal

(2) Where the quantity of *Class A flammable liquids* exceeds 10 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.

Storage cabinets

(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-in. 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.

Fire protection equipment

(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.

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.*[5]*

(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.*[6]*

*Superior number refers to the paragraph so numbered in the Advisory Reference Material.

(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.

Inside storage rooms

(5) *Flammable liquids* shall be stored inside *buildings* in accordance with the requirement 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.

Outside storage and dispensing

(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

Drains in buildings

(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 and 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 a public drainage system, and

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

Outside drainage

(8) Drainage for outside storage and dispensing areas shall be provided so that

(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.

Inspection for leakage

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

(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.

Ventilation

(12) Storage *buildings* and storage rooms for *flammable liquids* shall be ventilated according to their contents so that

(a) rooms storing more than 50 gal of *Class A flammable liquids* have positive exhaust ventilation 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.*

Explosion venting

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

(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.

Heating

(15) Heat for *flammable liquid* storage and dispensing areas shall be provided by indirect means employing

(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.*

Electricity

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

(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).

Static Electricity

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

(a) are connected by metal strapping or bare or insulated wire not less than 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 a non-sparking material or be constructed with any moving parts capable of producing static, properly grounded.

Drums and containers

(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.

Dispensing

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

(a) by means of *approved* drum pumps into *approved safety cans* except that *Class B flammable liquids* may be dispensed by means of *approved* automatic closing faucets and provided that metal drip trays at least 2 in. in height are used,

(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.

Fire protection equipment

(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.

Tank Storage of Flammable Liquids Inside Buildings

Class A flammable liquids

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

(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 liquids can escape into the enclosed space.

(2) Exceptions may be made for the above requirement where the *authority having jurisdiction* 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 *authority having jurisdiction* 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, except that where the floor or roof construction above the enclosure is 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.[7]*

Capacities and dimensions for flammable liquid storage tanks

(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	Mininum 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

*Superior number refers to the paragraph so numbered in the Advisory Reference Material.

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

Vertical tank specifications

(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

Testing of tanks and piping

(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 *authority having jurisdiction.*

Vents

(16) Venting of tanks used for storage of *flammable liquids* inside of *buildings* shall be such that

(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* fittings.

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 2 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,

(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 2 ft from any *building* opening and at least 3 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.

Conservation vents

(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.

Tank connections and fittings

(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.

Fill and discharge piping

(25) Fill pipe openings shall be located outside the *building* so that

(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* opening 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.

Overflow piping

(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.

Cross connections

(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.

Man-holes

(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

(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.

Valves

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

Gauging devices

(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.

Heating equipment

(35) Where inside storage tanks require heating facilities they shall be arranged so that

(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.

Fire protection equipment

(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.

(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 *authority having jurisdiction.*

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.

Location and installation

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

(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 2 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 4 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 of 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.

Anchorage

(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.

Corrosion protection

(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.

(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 *authority having jurisdiction.*

Construction of tanks

(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.

Testing of tanks and piping

(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).

Vents

(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.

Vent sizes

(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.

(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

Installation of vent pipes

(a) pipes from tanks containing *Class A flammable liquids* terminate outside and at least 2 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,

(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 2 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

Flame arrestors

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

Conservation vents

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

Tank connections and fittings

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

(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.

Fill and discharge piping

(20) Fill and discharge piping for underground tanks shall meet the requirements of article 2.1.6.8., sentences (26), (27), (28) and (29).

Overflow piping

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

Cross connections

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

Man-holes

(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.[9]*

Gauging devices

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

Heating equipment

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

Fire protection equipment

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

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,

*Superior number refers to the paragraph so numbered in the Advisory Reference Material.

(b) the protection of important *buildings* by utilizing sloping ground or diked enclosures and locating the *buildings* upwind from the storage tanks, Location

(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 *authority having jurisdiction.* Distances between tanks, nearby buildings and property lines

TABLE 2.1.6.I
Forming Part of Sentence (2)

Capacity, gal	Distance for Class A Flammable Liquids, ft	Distance fort 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.[8]* Distances between tanks and railway tracks

*Superior number refers to the paragraph so numbered in the Advisory Reference Material.

(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

Spacing between tanks

(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.

Grouping of tanks

(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 accumulation of *flammable liquids* under adjacent *liquefied petroleum gas* containers such as by diking, diversion curbs or grading. When tanks containing *flammable liquids* are diked, the *liquefied petroleum gas* 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 *authority having jurisdiction* 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 located within the diked area.

Dike construction

(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 materials.

Control of waste combustibles

(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.

Drainage

(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.

Construction of tanks

(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.

(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.

Field erected vertical tanks

(23) Atmospheric tanks to contain *flammable liquids* shall be built in accordance with good practice.[9]*

(24) Low pressure tanks shall be built in accordance with good practice.[10]*

(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.[11]*

Shop-built tanks

(26) Shop-built tanks shall be fabricated to meet a standard satisfactory to the *authority having jurisdiction.*

(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

Large vertical tanks

(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.

(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.

*Superior number refers to the paragraph so numbered in the Advisory Reference Material.

(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 Metal 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

Special construction

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

Testing of tanks and piping

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

Foundations and supports

(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. pad 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 a 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 exceeds 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.

Flood protection

(41) Tank sites shall be sufficiently elevated so that the tanks may not become buoyant due to a rise in the level of the water-table 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.

Tank venting

(42) Normal breathing provided by vents in vertical cone-roofed 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.

Emergency relief vents

(44) Emergency relief vents are required on all above ground *flammable liquid* storage tanks to relieve excessive internal pressures 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.

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

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

imum outflow (vacuum) and inflow (pressure) of liquid as indicated in Table 2.1.6.Q.

(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.

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

(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.

(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).

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
3330	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

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.

Vent 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.

(55) Vents 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.

Tank connections and fittings

(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.

Fill and discharge piping

(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.

(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.

Man-holes

(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.

(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.

Gauging devices

(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.

Heating equipment

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

Fire protection 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.

Electrical equipment near tanks and vents

(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 1, Hazardous Locations.

(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

Location and arrangement of piping

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.

Above ground outdoor 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.

(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 *noncombustible* 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.

Buried piping

(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.

(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 backfill. Cinders and the like shall not be used as backfill.

Piping in ducts and trenches

(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.

(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.

Piping in tunnels

(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.

Pipe entrances to buildings

(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 the opening shall be sealed with cement grout.

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

Indoor piping

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

(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 injury. 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.

Provision for expansion and flexibility

(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.

(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.

Materials for use in piping systems

(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.

Wrought steel or iron pipes

(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.[12]*

(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

*Superior number refers to the paragraph so numbered in the Advisory Reference Material.

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.[13]*

Copper and brass pipe

(31) Copper tubing and copper or brass pipe may be used subject to the maximum temperature limitations imposed by good practice.[14]* It shall not be used where temperatures of over 400°F may be encountered.

(32) Copper tubing and copper or brass pipe used to carry *flammable liquid* shall be fabricated in accordance with good practice.[15]*

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

Other piping materials

(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.

Corrosion protection

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

(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.

Colour of piping

(38) All *flammable liquid* piping shall be coloured yellow.[16]*

Pressure testing

(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).

(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

*Superior number refers to the paragraph so numbered in the Advisory Reference Material.

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.

Threaded joints

(42) Screwed joints shall be threaded in accordance with good practice,[17]* and a suitable joint compound for the material being handled shall be used to seal the joints.

Welded joints

(43) *Welding* procedures, welders and *welding* operators shall follow good practice.[18]*

(44) *Welding* of outside transmission lines shall conform to good practice.[19]*

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

Flanged joints

(46) Flanged joints shall be made using forged or cast steel flanges of the appropriate pressure rating conforming with good practice,[20]* except as permitted in sentences (47) and (48).

(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.[21]*

(49) Bolting materials for flanged connections shall be of alloy steel conforming to good practice.[22]* In existing installations carbon steel and wrought iron bolts may be accepted.

Gaskets

(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.

Joints for non-ferrous piping

(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.

Valves

(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.

Location of 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.

*Superior number refers to the paragraph so numbered in the Advisory Reference Material.

(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.

Design of valves

(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.

(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*.

Automatic shut-off valves

(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.

(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.

Heating

(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.

(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.

Electrical equipment

(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 I, Division 2, Hazardous Locations.

Static electricity

(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.

(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.*

Care and cleanliness

(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.

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

Transfer by pumping

(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.

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

Pumps

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

(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 article 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.

Pits

(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.

Gravity transfer

(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.

Hydraulic transfer

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

(82) All tanks for hydraulic transfer systems shall be constructed, installed and tested in accordance with provincial regulations.[23]* 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.

Inert gas transfer

(83) Inert gas transfer systems shall be constructed, installed and tested in accordance with provincial regulations.[24]* 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.

Compressed air transfer

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

Fire protection equipment

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

*Superior number refers to the paragraph so numbered in the Advisory Reference Material.

2.1.7. HEATING APPLIANCES

Defective stove or heating device

2.1.7.1. The *owner* of a *building* shall not use or cause to be used, maintain, suffer or allow the use of a defective stove or heating device in a *building* and if in the opinion of the *authority having jurisdiction* a defective stove or heating device is used or maintained in any *building*, the occupant of the *building* shall on the *order* of the *authority having jurisdiction* forthwith remove or cause to be removed or repair or cause to be repaired to the satisfaction of the *authority having jurisdiction* the defective stove or heating device.

Solid-fuel-fired equipment

2.1.7.2.(1) Solid-fuel-fired equipment shall be designed and constructed in accordance with good practice and installed in accordance with the *building bylaw*.[25]*

(2) Coal and wood bins shall be of substantial construction and located at least 4 ft from the heating unit.

Oil-fired equipment

2.1.7.3. Oil-fired equipment including tanks shall be of a type *approved* by the appropriate *authority having jurisdiction.*

Gas-fired equipment

2.1.7.4. Gas-fired heating units and stoves shall be of a type *approved* by the appropriate *authority having jurisdiction.*

Electrical heating equipment

2.1.7.5. Electric heaters and stoves shall be of a type *approved* by the appropriate *authority having jurisdiction.*

TABLE 2.1.7.A
Forming Part of Article 2.1.7.7.

Minimum Clearances to Combustible Construction from Solid-Fuel-Fired Equipment, in.					
Equipment	Above	Front	Sides	Rear	Flue
Automatically stoker-fired forced warm air furnaces having approved safety controls	6	48	6	6	18
Domestic hot water or steam boilers	6	48	6	6	18
Furnaces and boilers (other)	18	48	18	18	18
Space heaters	36	48	12	12	18
Stoves and ranges	36	48	36†	36	18
Water heaters (direct fire in pot with fire clay lining)	36	48	24	12	18

† The clearance from the sides of a range burning solid fuel other than the fire box side may be 18 in.

*Superior number refers to the paragraph so numbered in the Advisory Reference Material.

Installation codes

2.1.7.6.(1) All heating appliances burning oil or gas or using electrical energy as a heat source shall be installed according to provincial regulations.[26*]

(2) Special precautions shall be taken to ensure that there is no risk of damage to piping or equipment from any possible differential movements of elements of the *building* structure.

Clearance to units from combustible construction

2.1.7.7. Clearances from *combustible* construction to oil- and gas-fired appliances shall be those published in the appropriate installation codes hereinbefore mentioned and in addition the clearances shall be maintained for solid-fuel-fired equipment and electrical equipment as outlined in Tables 2.1.7.A and 2.1.7.B.

Gas hot plates and heaters

2.1.7.8. Gas hot plates and heaters shall not be installed under wood shelving.

TABLE 2.1.7.B
Forming Part of Article 2.1.7.7.

Minimum Clearance to Combustible Construction from Electrical Equipment, in.				
Equipment	Above	Front	Sides	Rear
Room heaters	36	18	6	6
Stoves and ranges	36	18	6	6
Water heaters	18	18	6	6

2.1.8. PORTABLE EXTINGUISHERS

Requirement

2.1.8.1. *Portable extinguishers* are designed to be used for the extinguishment of fires in their incipient stage and are necessary even though the premises are equipped with automatic sprinklers or standpipe and hoses.

Approved extinguishers required

2.1.8.2.(1) A *portable extinguisher* shall be sold or offered for sale only when such extinguisher has been *approved* by the appropriate *authority having jurisdiction.*

(2) *Approved portable extinguishers* shall be provided in all *occupancies* classified in article 2.1.2.2. except those of Group C, Division 2.

For ordinary combustibles

2.1.8.3. On each floor of an *occupancy* whose contents are of such low combustibility that no self-propagating fire can therein occur *Class A extinguishers* shall be provided throughout, so located that a *person* will not have to travel more than 100 ft from any point to reach the nearest device, but at least one unit of extinguishing capacity shall be required for every 2500 sq ft of *floor area* or greater fraction thereof.

*Superior number refers to the paragraph so numbered in the Advisory Reference Material.

2.1.8.4. On each floor of an *occupancy* whose contents are likely to burn with moderate rapidity which if uncontrolled would threaten the whole *floor area, Class A extinguishers* shall be provided throughout, so located that a *person* will not have to travel more than 50 ft from any point to reach the nearest device, but at least one unit of extinguishing capacity shall be required for every 1250 sq ft of *floor area* or greater fraction thereof.

Location, Class A extinguishers

2.1.8.5. Where because of the character or quantity of *combustibles* more intense incipient fires may be anticipated the *authority having jurisdiction* may ask for additional extinguishers suitable for the extra hazard in addition to those required by articles 2.1.8.3. and 2.1.8.4.

Additional extinguishers

2.1.8.6. Where *Class B fires* are likely to occur *Class B extinguishers* shall be provided on the basis of one extinguishing unit for every 625 sq ft or greater fraction thereof of *floor area* to be protected and the travel distance shall not exceed 50 ft from any point to reach the nearest extinguisher.

For Class B hazards

2.1.8.7. For deep-layer *flammable liquid* fires as in *dip tanks* or similar individual hazards at least one *Class B extniguisher* shall be provided on the basis of one numerical unit of *extinguishing potential* per square foot of the largest individual hazard to be protected. The size of extinguisher shall be commensurate with the protection required for the hazard and multiple units are not acceptable. When *approved* automatic protection is provided the requirement of this article need not apply.

Protection against deep-layer flammable liquid fires

2.1.8.8. *Class B extinguishers* are not acceptable in lieu of required *Class A extinguishers* unless the device selected has a Class A rating. An extinguisher carrying both Class A and Class B designations may be acceptable for area requirements under each individual letter classification.

Allowance for multiple-rated extinguishers

2.1.8.9. *Class A extinguishers* located in an area whose contents are of such low combustibility that no self-propagating fire can therein occur may be reduced in numbers by 50% where the area is also protected by *Class B extinguishers* which have no Class A rating, provided that the travel distances required by this Code are not exceeded.

Reductions in areas protected by both Class A and Class B extinguishers

2.1.8.10. Where fires may have to be extinguished in energized electrical equipment, *extinguishers* with *Class C* classification shall be required. Distribution shall be in accordance with applicable provisions for *Class B extinguishers.*

Fires in electrical equipment

2.1.8.11. In locations where extinguishers are likely to be obscured by piles of cartons, crates, lumber, stock, files etc., or in large open areas, means shall be provided to indicate conspicuously the location of the extinguishers.

Location of extinguishers

Near fire hazards

2.1.8.12. Extinguishers in proximity to a fire hazard shall be carefully located as to be accessible if needed without exposing the operator to undue risk.

Operation of extinguishers

2.1.8.13. A *portable extinguisher* shall be *approved* for use by the *authority having jurisdiction* and shall bear a label which states clearly and distinctly how it is to be operated. Where possible, personnel shall be designated to operate the *portable extinguishers* on a premises and they shall be familiar with all the types of extinguishers provided.

Filling

2.1.8.14. Extinguishers shall be kept full (to filling mark) at all times and recharged immediately after use.

Inspection

2.1.8.15. Extinguishers shall be examined bi-monthly to ensure that they are in their proper location and have not been tampered with.

Maintenance

2.1.8.16. Proper maintenance shall be carried out periodically on all types of *portable extinguishers* to ensure that they are in constant working order.

NOTE: Proper maintenance is that exemplified by Standard No. 10, Portable Fire Extinguishers, of the Canadian Underwriters' Association.

SECTION 2.2 PROTECTION OF THE PUBLIC

2.2.1. ASSEMBLY OCCUPANCIES, HOTELS AND MOTELS

General Requirements

Occupant load

2.2.1.1. The keeper of a place of assembly shall at all times restrict the occupant load of that place to that as placarded by the *authority having jurisdiction.*

Exit signs

2.2.1.2. *Approved exit* signs shall be posted in all *means of egress* and the requirements of subsection 2.1.5. shall be adhered to.

Exit notices required

2.2.1.3. The keeper of a *hotel* or *motel* shall provide and keep posted in every apartment or room a conspicuous notice describing the location of the *exits.*

Maintaining fire safety

2.2.1.4. The *owner* or keeper of a place of assembly, *hotel* or *motel* shall keep in proper working order and repair at all times where applicable all *exit* lights, hardware on *exit* doors, *chimneys,* heating systems, range hoods and vents, fire protection requirements, including but without limiting the generality of the foregoing, *portable extinguishers,* sprinkler systems, standpipes, fire alarm systems, fire doors, *basement* pipe inlets and any other requirements for the purpose of fire protection contained in this Code.

Smoking prohibited

2.2.1.5. Where conditions in a place of assembly, *hotel* or *motel* are such as to make *smoking* a hazard the requirements of article 2.1.4.14. shall apply.

2.2.1.6. The *owner* or keeper of a place of assembly, *hotel* or *motel*, shall provide *portable extinguishers* in accordance with subsection 2.1.8. Portable extinguishers

2.2.1.7. *Fire protection equipment* shall be installed in places of assembly, *hotels* and *motels* in accordance with good engineering practice as required by the *authority having jurisdiction.* Fire protection equipment

2.2.1.8.(1) No *person* shall keep, store, use or cause or permit to be kept, stored, or used any *combustible*, *explosive* or flammable material Storage

(a) on a roof or adjacent to a *building* used or maintained as a place of assembly, *hotel* or *motel* in such a way as to create a fire hazard or restrict the access of the fire department personnel to the *building* in any way, or

(b) in any other part of a place of assembly, *hotel* or *motel* except with the written *approval* of the *authority having jurisdiction.*

2.2.1.9.(1) No *decorative material* whose application presents an ignitable surface shall be used in a place of assembly. A match flame test applied in fire-safe surroundings to a piece removed from the material shall determine the degree of hazard present. The piece of material to be tested shall be held in a vertical position exposed to a flame from a common match held in a horizontal position 1/2 in. underneath the piece and in a constant location for a minimum of 15 secs. Decorative material

(2) Treatments used to accomplish flameproofing for the purpose of sentence (1) shall be renewed as often as may be necessary to maintain the flameproof effect.

2.2.1.10. The *owner* of a vacant *building* which is classed as a place of assembly, *hotel* or *motel* shall at all times keep the *building* free from debris and flammable material and shall keep all openings in exterior walls of the *building* securely closed and fastened in order to prevent the entry of unauthorized *persons.* Seasonal occupancy

Staff Duties and Watchman Services

2.2.1.11.(1) The *authority having jurisdiction* shall advise the keeper of each place of assembly, *hotel* or *motel* of the duties to be performed by employees in the event of fire, alarm of fire, panic or other emergency whether of the foregoing kind or not. Training staff for emergencies

(2) The keeper of each place of assembly, *hotel* or *motel* shall ensure that each employee of the place, *hotel* or *motel* is instructed and drilled in the duties he is to perform in the event of fire, alarm of fire, panic or other emergency whether of the foregoing kind or not.

2.2.1.12.(1) The keeper of a *hotel* containing more than 40 bedrooms furnished for use shall employ a night watchman who shall be on duty from 10 o'clock each night until 8 o'clock on the following morning. Night watchman

(2) A night watchman employed pursuant to sentence (1) shall patrol each floor, including the *basement*, at regular intervals not exceeding once every hour during his time on duty and a time clock or other *approved* device shall be placed on each floor where the watchman shall register each patrol and the chart from the time clock or other device shall be removed daily and kept in the *hotel* office where it may be viewed by the *authority having jurisdiction.*

Tented Areas

Separations

2.2.1.13.(1) Subject to sentence (3) a *tent* shall not be erected so that it covers more than 75% of the available open space or be erected closer than 10 ft to other structures, fences or obstructions.

(2) The outer perimeter of stake lines of adjacent *tents* shall be sufficiently distant from each other to provide a *means of egress.*

(3) Concession or other *tents* not occupied by the public need not be separated from each other and may be erected less than 10 ft from other structures only if the *authority having jurisdiction* deems such closer spacing does not create a hazard to the public.

Flame resistant treatment

2.2.1.14.(1) Each *tent* within an area used by the public and each tarpaulin and all *decorative materials* in connection with any of these shall be given a flameproofing treatment.[27]* *Decorative materials* for indoor use need not be subjected to accelerated weathering tests.

(2) Safety nets are exempt from the requirements for resistance to fire referred to in sentence (1).

(3) The *authority having jurisdiction* shall

(a) make field tests,[27]*

(b) require a certificate or other evidence of *approval* by a *recognized testing laboratory*, or

(c) accept the report of tests made by other administrative officials or a *recognized testing laboratory* as evidence that the *tents*, tarpaulins and decorations have the required resistance to fire.

Safety of tented areas

2.2.1.15.(1) The electrical system in a *tent* shall be installed, maintained, and operated in a safe manner and if it is portable it shall be inspected by the *authority having jurisdiction* and any defects found shall be corrected before the public is admitted to any show or performance.

(2) The electrical system and equipment in a *tent*, including the electrical fuses and switches, shall be completely isolated from the public and cables on the ground in areas traversed by the public shall be placed in trenches or protected by *approved* covers.

*Superior number refers to the paragraph so numbered in the Advisory Reference Material.

(3) The ground enclosed by a *tent* used in connection with a *place of outdoor assembly* shall, for a distance of not less than 10 ft outside of the *tent*, be cleared of all flammable material or vegetation and the premises shall be kept free from flammable materials during the period for which the premises are used by the public.

(4) Hay, straw, shavings or similar *combustible* material other than that necessary for the current feeding and care of animals shall not be permitted within a *tent* accessible to the public except that sawdust and shavings may be used if kept damp.

(5) *Smoking, fireworks* or open flame of any kind shall not be permitted in a *tent* while it is occupied by the public unless *approved* by the *authority having jurisdiction.*

(6) Subject to sentence (5), NO SMOKING signs shall be conspicuously posted in any *tent* open to the public in accordance with article 2.1.4.14.

(7) *Tents* shall not be used for the display of motion pictures unless safety film is used.

Fire alarm and emergency communication

2.2.1.16. In cases of grandstands and *tents* where accommodation is provided for more than 1000 *persons*, one or more methods of fire alarm and emergency communication shall be arranged for by the *owner.*

Fire watchers to be employed

2.2.1.17.(1) One or more fire watchers shall be employed by all circuses, carnivals, or other exhibitions where facilities have been designed to accommodate an assembly of more than 1000 *persons.*

(2) A fire watcher employed in accordance with sentence (1) shall familiarize himself with all fire protection facilities and *fire prevention* features and with the conditions of *exits*, and shall patrol the entire *tent* area during the time of *occupancy* and shall see that aisles and exitways are kept open and that regulations pertaining to *smoking* are enforced.

2.2.2. FIRE EVACUATION PROCEDURES FOR SCHOOLS AND INSTITUTIONS

Establishment of proper procedures

2.2.2.1.(1) The *person* in charge of every hospital, home for the aged or *nursing home* and the principal of every school, including private schools, shall establish a procedure according to *approved* practice to be followed in the event of fire or an alarm of fire.

(2) The procedure established under sentence (1) shall include the duties of the staff in the event of fire and shall include evacuation routes for the other occupants of the *building.*

(3) The superintendent or principal referred to in sentence (1) shall instruct the staff and occupants in the procedure established under sentences (1) and (2) and shall post the appropriate procedure in a conspicuous place in each *occupancy* referred to in sentence (1).

Fire drills

2.2.2.2.(1) A minimum of 10 fire drills shall be held each year at irregular intervals.

(2) Fire drills in schools shall be held at least 5 times in the fall of the year commencing immediately after the school opens.

(3) During inclement weather drills need not be held.

(4) No *persons* except the superintendent, principal or members of the local fire department shall be aware that a fire drill is about to take place.

(5) Residents or occupants shall not be allowed to get their outer garments when a fire drill is held.

(6) In schools, pupils shall be instructed to keep in line during a fire drill to avoid crowding and to refrain from talking.

(7) Hand signals shall be used to start or stop marching.

(8) Pupils, residents or other *persons* shall proceed to a predetermined point of safety outside the *building* and remain there until a check is made to account for everyone in the *building*.

(9) Records of fire drills carried out will be kept and shown upon request to the *authority having jurisdiction.*

Fire alarm and detection systems

2.2.2.3.(1) Fire alarm and detection systems shall be installed in accordance with good engineering practice[34]* and shall be *approved* by the *authority having jurisdiction.*

(2) The principal of every school and the superintendent of every hospital, home or other institution referred to in article 2.2.2.1. shall ensure that each staff member and occupant or pupil who is capable is instructed in the method of sounding an alarm of fire and that each staff member is instructed in the proper method of using first aid fire-fighting appliances.

Signals

2.2.2.4.(1) All fire *exit* drill alarms shall be sounded on the fire alarm system.

(2) In order that evacuees will not be returned to a *building* which is burning, the recall signal shall be one that is separate and distinct from and cannot be mistaken for any other signals.

2.2.3. NURSING HOMES

Scope

2.2.3.1. This subsection outlines occupant safety from fire and *fire prevention* requirements for *nursing homes.* Fire regulations pertaining to *building* size, fire spread between and inside of *buildings, exit* details and occupant load requirements shall be those contained in the *building bylaw.*[29]*

Definition

2.2.3.2. *Nursing home* or home for the aged means a private home, institution, *building,* residence, or other place whether operated for profit or not which provides through its ownership or management, maintenance, personal care, or nursing to 3 or more persons who by reason of illness or physical infirmity are unable

*Superior number refers to the paragraph so numbered in the Advisory Reference Material.

to properly care for themselves, or provides sheltered care to 3 or more aged persons not related to the operator by blood or marriage but who need such shelter. The term does not include the following:

(a) a home, institution, or other place operated by the provincial or federal government or agency thereof,

(b) a hospital, sanatorium or other institution whose principal activity or business is the diagnosis, care and treatment of persons suffering from mental or nervous diseases,

(c) a hospital, sanatorium or other institution whose principal activity or business is the diagnosis, care and treatment of human illness through the maintenance and operation of organized facilities therefor, or

(d) any child welfare agency, maternity hospital or lying-in home separately licensed by the municipality.

Locating patients

2.2.3.3. No person under care or treatment in a *nursing home* shall be permitted to occupy

(a) any floor higher than the second unless the *building* is of fire-resistive construction, or

(b) any room in a *cellar* or *basement*.

Personnel required

2.2.3.4. The number of personnel required to ensure occupant safety in the event of a fire shall be as follows:

(a) if the *building* is of fire-resistive construction and is located within an area served by a municipal fire department which can be called by telephone or fire alarm system, the home shall have an attendant on duty at all times who is awake and dressed and also one attendant on standby duty on the premises for emergencies for each group of 25 persons or fraction thereof who are cared for in the *building*,

(b) if either the construction of a *building* occupied as a *nursing home* is not fire-resistive or the *building* is not in an area served by a municipal fire department, one full-time attendant and one standby attendant shall be required as in clause (a) for each group of 20 persons or fraction thereof who are cared for in the *building*,

(c) if neither the construction nor the location of the *building* occupied as a *nursing home* meets fire-resistive or location requirements mentioned in clause (a) then one full-time attendant and one standby attendant shall be required as in clause (a) for each group of 15 persons.

Evacuation procedures

2.2.3.5. A *nursing home* shall have an evacuation procedure as required by subsection 2.2.2. and written instructions shall be posted in staff working areas.

Employee training

2.2.3.6. All new employees shall be trained in evacuation methods and procedures before they are permitted to assume complete responsibility for the safety of residents.

Fire-resistive cut-offs

2.2.3.7. Each *floor area* above the first floor occupied by 30 or more persons shall be divided into 2 sections by a fire-resistive cut-off each of which have a *means of egress* in conformity with the *building bylaw.*[30]*

Smoking

2.2.3.8.(1) In addition to the requirements of article 2.1.4.14., *smoking* shall be controlled by

(a) permitting safety matches only to be used,

(b) providing specific smoke breaks for employees, and

(c) permitting *smoking* in bed during specified periods under supervision.

Open flames

2.2.3.9. No open flame lighting equipment shall be used in a *nursing home.*

Furnace room

2.2.3.10. The furnace room in a *nursing home* shall be constructed to provide a *fire resistance rating* of 1 1/2 hr.

Portable extinguishers

2.2.3.11. *Portable extinguishers* shall be provided as required by subsection 2.1.8.

SECTION 2.3 INDUSTRIAL AND COMMERCIAL OPERATIONS

2.3.1. SCOPE

2.3.1.1. This section of the Code provides regulations to ensure fire protection for specific industrial and commercial *occupancies* where the use and handling of hazardous materials or the stockpiling of flammable materials creates a serious fire hazard.

2.3.2. RUBBER TIRE STORAGE

Piling of tires

2.3.2.1.(1) A single pile of *tires* in a *tire storage warehouse* shall not occupy an area greater than 5000 sq ft.

(2) The maximum length of a single pile of *tires* shall not be greater than 100 ft.

(3) The maximum height of a single pile of *tires* shall not be greater than 14 ft.

(4) The minimum clearance between the top of a pile of *tires* and the head deflection of the automatic sprinklers required under this Code shall be not less than 30 in.

Storage separations

2.3.2.2.(1) The width of cross aisles and main aisles between individual piles of *tires* shall be not less than 8 ft, but where the individual piles of *tires* do not exceed 2500 sq ft cross aisles may be not less than 4 ft.

(2) A minimum clearance space of 24 in. shall be maintained between piles of *tires* and unprotected columns, and between piles of *tires* and enclosing walls.

*Superior number refers to the paragraph so numbered in the Advisory Reference Material.

2.3.2.3.(1) Each rubber *tire storage warehouse* having more than 5000 sq ft of *floor area* shall be provided with an *approved* automatic sprinkler installation with a water supply that is sufficient to supply not less than 20 sprinklers at the required pressures and also an additional 500 gal/min for hose streams. Sprinkler system required

(2) A water flow alarm device listed by a *recognized testing laboratory* shall be provided for each sprinkler riser installed in a rubber *tire storage warehouse.*

2.3.2.4. A standpipe and hose system shall be provided in each rubber *tire storage warehouse* installed in accordance with good engineering practice and *approved* by the *authority having jurisdiction.* Standpipes

2.3.2.5. Extinguishers shall be provided in each rubber *tire storage warehouse* Portable extinguishers

(a) in order that for every 5000 sq ft of *floor area* or greater fraction thereof there is a dry chemical extinguisher whose rated extinguishing potential is 20-B, and

(b) when required by the *authority having jurisdiction* in accordance with subsection 2.1.8.

2.3.3. SALVAGE SHOPS AND SALVAGE YARDS

2.3.3.1.(1) The operator of a salvage shop or salvage yard or automobile wrecking yard shall Maintenance

(a) keep it clean and in good repair and shall not display goods or materials outside the shop or yard, and

(b) cut down grass and weeds so as not to constitute a danger of spread of fire.

2.3.3.2.(1) Different types of salvage material or *second-hand goods* shall be separated and stored in separate piles. Piling of salvage material

(2) Piles of *combustible* salvage material shall be limited in height to 10 ft and individual piles shall be limited in area as required by an *inspector.*

(3) In no instance shall the area of a pile of *combustible* salvage material be greater than 1000 sq ft.

(4) Piles of salvage materials or *second-hand goods* shall be separated to prevent accidental fire spread from one pile to another and to facilitate convenient passage of vehicles between them as may be required by the *authority having jurisdiction* and in no instance shall the separation between piles be less than 10 ft.

(5) *Combustible* salvage material or *second-hand goods* shall not be piled within 10 ft of the boundaries of the salvage shop or salvage yard.

(6) The roof of a salvage shop or of a *building* located in a salvage yard shall not be used for storage purposes.

Starting fires on premises

2.3.3.3. No fire other than that used only for heating purposes or for operating machinery or equipment shall be lighted or allowed to burn in or upon a salvage shop or salvage yard except in that area designated by the *authority having jurisdiction.*

Fencing

2.3.3.4. Each salvage shop and salvage yard shall be surrounded by a substantial fence not less than 8 ft and not more than 10 ft high. Each gate in the fence shall be of substantial construction similar to that of the fence and be located in a position *approved* by the *authority having jurisdiction* so that it will not open upon public property.

2.3.4. LUMBER YARDS AND WOODWORKING PLANTS

Piling in open yards

2.3.4.1.(1) Lumber shall be piled in orderly and regular piles preferably on solid ground and shall not be piled on refuse or sawdust-filled land unless such sawdust-filled land is properly prepared and covered with a layer of earth.

(2) Lumber shall be piled with due regard to stability of piles and in no case shall the height of a stickered pile (open for air drying) exceed 20 ft.

(3) Lumber piles shall be arranged in individual groups. The maximum width of each individual group of piles shall not exceed 50 ft, and maximum length shall not exceed 150 ft.

(4) Stickered lumber piles shall not be located within 50 ft of the property line or *buildings* wherein personnel are regularly employed or goods warehoused.

Driveways

2.3.4.2.(1) Driveways between individual groups of piles of lumber shall be not less than 15 ft in width and maintained free from accumulation of rubbish, equipment and other articles or materials.

(2) Driveways shall be so spaced that a maximum grid system unit of 50 ft by 150 ft is produced.

(3) There shall be 2 passages, each of which shall be at least 15 ft in width, providing access to a lumber yard directly from a street or lane and the 2 passages shall be remote from each other as directed by the *authority having jurisdiction.*

Vehicles

(4) The overnight parking of vehicles or stacking equipment in a driveway shall not be permitted unless the driveway exceeds 25 ft in width and such vehicles or stacking equipment are parked on one side only of such a driveway.

Burning waste

2.3.4.3.(1) In a lumber yard, shavings, sawdust and refuse materials shall be burned only under boilers, in furnaces or in incinerators or refuse burners which are safely constructed and located.

(2) Stacks shall be provided with suitable *spark arrestors* having openings not greater than 3/4 in. or with an expansion chamber, baffle walls or other means effective to eliminate the danger from sparks.

(3) A storage bin of *noncombustible* construction with a raised sill shall be provided at a boiler or other points where sawdust or shavings are used as fuel.

(4) Sawdust, chips, shorts and other waste shall be removed regularly from piling areas and an orderly arrangement of material shall be maintained at all times.

(5) Weeds shall be kept down and treated as often as needed with a satisfactory weed-killer or be cut and grubbed out. Dead weeds shall be removed and disposed of off the premises. Weeds

2.3.4.4. Each lumber yard shall be surrounded by a substantial fence not less than 8 ft and not more than 10 ft high. Each gate in the fence shall be of substantial construction similar to that of the fence and be located so as not to open upon public property in a position *approved* by the *authority having jurisdiction.* Fencing

2.3.4.5. Electrical power lines shall not be located over a lumber storage area. Power lines

2.3.4.6. In a lumber yard the heating equipment shall conform with subsection 2.1.7. and salamanders, braziers, or other open fires shall not be used. Portable heaters shall be of an *approved* type. Heating equipment

2.3.4.7. *Smoking* in lumber yards is prohibited except as permitted under article 2.1.4.14. Smoking

2.3.4.8.(1) The telephone number of the municipal fire department (where available) and the location of the nearest fire alarm boxes or telephone shall be posted conspicuously in several locations in the open yard and *buildings* of each lumber yard. Fire protection

(2) Water barrels of at least 45 gal capacity with 3 pails attached, each of 10 qt capacity or *approved* portable extinguishing equipment having a rated *extinguishing potential* of 2-A shall be located at each driveway so that a travel distance of not more than 75 ft along the driveway is needed from any part of the open yard to reach a barrel or extinguisher. Where necessary, extinguishing equipment shall be protected against freezing.

(3) Water barrels and pails or other *approved* first aid fire extinguishing equipment shall be provided for sheds in the yard area.

(4) Portable extinguishing equipment shall be provided in accordance with subsection 2.1.8. in each *building* forming part of a lumber yard.

(5) (a) A sufficient number of hydrants shall be installed in the yard area to supplement the municipal hydrants available so that every part of the lumber yard area may be reached by using not more than 200 ft of hose.

(b) Hydrants in the yard area shall be supplied with water from a looped water main connected to the municipal water supply at the street main.

Woodworking plants

2.3.4.9.(1) Sawmills, planing mills and other woodworking plants shall be equipped with

(a) refuse-removal systems which will collect and remove sawdust and shavings as produced, or

(b) suitable metal or metal-lined bins which shall be provided with normally closed covers or automatically closing covers and which shall be installed at or near the machines, and shavings and sawdust shall be swept up and deposited in those bins at sufficiently frequent intervals to keep the premises and machinery clean.

Blower and exhaust systems

2.3.4.10. Blower and exhaust systems shall be installed in each sawmill, planing mill and other woodworking plant in accordance with good practice.[29]*

Appliances

2.3.4.11.(1) Where glue pots, soldering irons, or appliances intended to be applied to *combustible* materials are in use they shall be

(a) provided with an indicating switch and a red pilot light, or

(b) equipped with an integral temperature limiting device in which case the pilot light may be omitted if permitted by the *authority having jurisdiction.*

Fire protection equipment

2.3.4.12. In addition to the requirements of subsection 2.1.8., *Class A extinguishers* or a small hose coupled to a water line shall be provided near any machine producing shavings or sawdust.

2.3.5. PIERS AND WHARFS

Scope

2.3.5.1.(1) The following requirements in connection with the maintenance of pier and wharf structures and of *fire protection equipment*, housekeeping, safeguarding of common and special hazards, storage and operation of marine terminals are not intended to modify federal or provincial legislation which may apply.

(2) Piers and wharfs of a marine terminal shall be considered as temporary *warehouses* for merchandise under shipment.

Boilers and heating equipment

2.3.5.2.(1) Boilers and heating equipment used for power or heat shall be located in *buildings* detached from the pier or shall be enclosed on the pier by walls, floor and ceiling of materials rated not less than 2-hr fire resistance.

(2) Floors or decks immediately beneath and extending for a distance of 3 ft from boilers, furnaces and other heat-producing appliances shall be entirely *noncombustible* and no *combustible*

*Superior number refers to the paragraph so numbered in the Advisory Reference Material.

material shall be permitted in contact with the top or bottom surfaces of such portion of a floor or deck.

(3) Small hot-water heaters or space heaters and other small appliances of a type *approved* for mounting on a *combustible* floor may be installed for use on piers and wharfs when *approved* by the *authority having jurisdiction.*

(4) Gas and gas-heated steam radiators when installed shall be supplied through rigid iron pipe connections located at least 12 in. from all *combustible* material unless such materials are protected by metal with not less than 2-in. air space, in which case the distance may be reduced to 6 in.

(5) When the design of gas-heated steam radiators is such as to cause the floor to become heated a protection of not less than 3/16 in. asbestos millboard held between 2 sheets of No. 29 United States Standard Metal Gauge sheet metal shall be provided.

Special processes

2.3.5.3.(1) Special processes involving the use of flammable volatile solvents are prohibited.

(2) Ripening or colouring of fruits or vegetables, cleaning of cocoa bean or other sweepings and fumigation shall not be carried on upon the pier or wharf unless the process is properly segregated and under the protection of automatic sprinklers.

Trucks and automobiles

2.3.5.4.(1) Transient trucks and automobiles shall be allowed to remain on piers and wharfs only long enough to load and unload cargo.

(2) Trucks or automobiles in noticeably poor mechanical condition including those exhausting carbon sparks, or dripping gasoline or oil shall not be permitted on a pier or wharf.

(3) The number of vehicles permitted upon the pier or wharf at any one time shall be limited to a predetermined number and such vehicles shall not be permitted to block the main aisle.

(4) The motors of trucks delivering or receiving goods on a pier or wharf shall be stopped while being loaded or unloaded.

(5) The replenishing of the fuel supply, or the draining of the fuel supply, or making repairs shall be prohibited upon the pier or wharf and any truck or automobile whose fuel supply has become exhausted shall be towed from the pier.

Mobile equipment

2.3.5.5.(1) (a) Tractors, fork lift trucks and dock cranes operated by internal combustion engines shall be of *approved* construction and stored in separate detached *garage buildings* which are located at the shore end of the pier in a segregated area, and

(b) the floor of the segregated area shall be free from pits and depressions and have a slope to outside drain ashore.

(2) Tractors, fork lift trucks and dock cranes which are operated by electric motors and are a part of the pier and wharf equipment

may be stored on the pier or wharf provided the area in which they are stored is properly segregated.

(3) Each vehicle shall be provided with an *approved* extinguisher.

(4) Repairs requiring the application of heat or the disconnection of the fuel supply shall not be carried out on any pier or wharf.

(5) No vehicle shall be refuelled on any pier or wharf.

(6) No fuel shall be stored or kept on any pier or wharf.

(7) Volatile liquids used for cleaning shall not have a *flash point* lower than 100°F.

Locomotives and cars

2.3.5.6.(1) Locomotives shall be prohibited from entering upon the pier or wharf.

(2) Locomotives operated within the area of a marine terminal wherein *combustible fibres* or lumber is stored shall be fitted with *approved* and properly maintained *spark arrestors.*

(3) Diesel locomotives shall not be fuelled within the boundary of a marine terminal except at a properly located and designed fuelling station acceptable to the *authorities having jurisdiction.*

(4) The handling of cars shall be effected by the use of a sufficient number of additional cars so as to make it unnecessary for locomotives to enter on the pier or wharf.

(5) Cars shall not be allowed to remain in the openings of fire walls or fire divisions longer than the time actually necessary for the manipulation of the cars and the cars shall be kept coupled.

(6) Cars containing hazardous commodities not permitted for shipping over a pier or wharf of a marine terminal shall not be permitted within the boundaries of a marine terminal.

Carpentry shops

2.3.5.7.(1) All carpentry work shall be done in a properly segregated room provided for the purpose.

(2) Woodworking machines which produce more than 3 bbl of shavings or sawdust per day shall be connected to a blower system.

(3) Waste materials shall be swept up daily, placed in *approved* metal containers and removed from the carpentry shop.

(4) Glue pots shall be heated in water containers by steam or electricity. Electrical heaters shall be equipped with a pilot light to indicate when heater is in operation.

Flammable liquids

2.3.5.8.(1) *Flammable liquids* shall be stored in containers which are acceptable to the Board of Transport Commissioners for Canada.

(2) Any pipe-lines used for transporting *flammable liquids* on any pier or wharf shall be fitted with a manual control valve and an automatic valve located on shore which will prevent the flow of *flammable liquids* in the event the pipe-line is ruptured. Pipe-

lines transporting *flammable liquids* shall be grounded and bonded and test not more than 5 ohms resistance to ground.

Lighting

2.3.5.9.(1) Lighting shall be by electricity with all equipment installed in accordance with article 2.1.4.15.

(2) If use of portable equipment is essential, electric battery-operated equipment shall be used.

Maintenance and refuse removal

2.3.5.10.(1) The pertinent regulations contained in subsection 2.1.4. shall apply where necessary to piers and wharfs.

(2) Trusses, girders and other structural members shall be cleaned by vacuum regularly to limit the accumulation of flammable dust.

(3) Heavy incrustation of oil shall be removed from all *combustible* members.

(4) Floating *combustible* debris shall be removed.

Sampling merchandise

(5) (a) Sampling of merchandise by consignees shall be restricted to a minimum and shall be carried on under the supervision of a competent representative of the pier or wharf operator,

(b) care shall be taken to see that all packages are securely closed after sampling and that the material sampled has not been disturbed in a way that may cause fire, and

(c) any refuse caused by sampling shall be removed immediately.

Maintenance of structure

2.3.5.11.(1) Piers and wharfs having *combustible* substructures shall be inspected at periodic intervals to determine the condition of the substructure members.

(2) Any such members when found to be infected with rot, shattered, split, or otherwise readily susceptible to fire shall be repaired or replaced.

Maintenance of fire protection equipment

2.3.5.12.(1) The care and maintenance of *fire protection equipment* shall be in accordance with good practice[27, 31*] acceptable to the *authority having jurisdiction.*

(2) *Fire protection equipment* shall not be used for any other purpose other than fire drills or fire fighting or life saving.

(3) Covers for nozzle openings in the pier deck for use of substructure *fire protection equipment* shall be kept in good order.

(4) Special periodic inspections shall be made beneath the deck to determine conditions relating to *fire prevention* and protection in the substructure.

(5) Fire protective devices such as automatic sprinklers, non-automatic sprinklers, fire stops, monorails, etc., shall be carefully examined and promptly repaired if repairs are necessary.

*Superior numbers refer to the paragraphs so numbered in the Advisory Reference Material.

Locating cargo and storage

2.3.5.13.(1) A system for placing cargo on piers shall be established by the *owner* and instructions given to pier superintendents, dock masters, stevedors and checkers as to how and where to put cargoes.

(2) Cargo spaces shall be marked out on the deck of the pier by easily visible paint lines at least 3 in. wide and all cargo shall be stored within these lines.

Aisle spacing

(3) When marking lines, aisle spaces must be provided in order that

(a) there is at least one main aisle extending the entire length of the pier,

(b) other aisle spaces of adequate width are established between cargo piles extending from the main aisle to the pier side, and

(c) 2-ft aisle spaces are maintained between cargo piles and the sides of the pier, fire walls or fire stops in enclosed piers.

Overhead clearance

(4) When cargo is piled beneath trusses, beams, girders or other structural members of the pier a clearance of not less than 36 in. shall be maintained.

Acceptance of hazardous cargoes

(5) Cargo known to be hazardous shall not be accepted unless packed, marked and labelled as required under the regulations of the Board of Transport Commissioners for Canada.

(6) *Explosives* shall be loaded or unloaded at special areas designated by the *authority having jurisdiction.*

Outdoor storage sites

2.3.5.14.(1) Sites for outdoor storage of *combustible* materials shall have adequate water systems with hydrants suitably located for protection of the storage, good drainage, adequate all-weather roads for fire department use, and remoteness from *buildings* of *combustible* construction or some other *combustible* storage which might constitute an exposure hazard.

Materials

(2) *Combustible* materials shall be stored in unit piles as small in height and area as is consistent with the *approved* practice for the material stored.

(3) Aisles shall be maintained between individual piles, between piles and *buildings*, and between piles and the boundary of the storage site.

(4) The entire property shall be surrounded by a fence or other suitable means to prevent access of unauthorized *persons.*

(5) An adequate number of gates shall be provided in the surrounding fence or other areas so as to permit ready access of fire apparatus in the case of fire.

Fire protection

2.3.5.15.(1) A complete system of automatic sprinklers shall be installed for the protection of all *combustible* substructures.

(2) The requirement of a complete automatic sprinkler system may be waived by the *authority having jurisdiction* for piers and wharfs which

(a) have solid decking 25 ft or less in width,

(b) are 5000 sq ft in area or smaller exclusive of approach ways 25 ft or less in width,

(c) are separated by at least 30 ft from other structures, and

(d) have no superstructures exceeding 300 sq ft in individual area nor exceeding 1000 sq ft aggregate area, nor are less than 30 ft apart.

Installation of sprinklers

(3) Installation of sprinkler equipment shall be in accordance with good practice.[33]*

(4) In those parts of waterfront structures where sprinkler piping or equivalent may be subject to damage by floating debris, such as beneath certain depressed sections of pier decks, the *authority having jurisdiction* may permit deviations from the strict application of the standards and may require alternative methods of protection.

(5) Where there is danger of damage to sprinkler equipment by floating objects, suitable barriers shall be provided to exclude such objects by use of the fender system or by other suitable means.

(6) Sprinkler systems in under-deck areas shall be properly protected throughout against corrosion.

(7) All sprinkler heads used in under-deck spaces shall be corrosion resistant.

Water supply mains

(8) Water supply mains shall be installed in the under-deck space where possible; however, they may be installed within the superstructure with adequate protection against frost and physical damage.

Deck openings

(9) In existing substructures where, in the opinion of the *authority having jurisdiction*, it is impracticable to install and maintain an automatic sprinkler system, the installation of deck openings for revolving nozzles and other devices may be accepted in lieu thereof provided that

(a) openings in the pier deck shall be provided at intervals not exceeding 25 ft on centres to enable the fire department to place in operation with the least possible delay devices suitable for extinguishing under-deck fires,

(b) openings are over clear spaces to avoid interference by substructures to effective operation of extinguishing devices,

(c) the deck openings are not larger than 10 in. in their greatest dimensions and are of sufficient size to accommodate the appliances for which they are intended,

(d) the deck openings are provided with covers that can be removed easily, and

*Superior number refers to the paragraph so numbered in the Advisory Reference Material.

(e) the covers for deck openings are constructed of such material or so insulated that they will resist the passage of heat and fire in a manner equivalent to that of the pier deck,

(f) the locations of deck openings are conspicuously indicated,

(g) where openings in the pier deck are installed all parts of the deck, including aprons, upon which fire fighters may be expected to work are solid, continuous, resistant to smoke penetration and have no uncovered openings, and

(h) the deck openings shall remain cleared of all obstructions including cargo, material handling equipment, etc.

(10) Where openings in the pier deck are installed there shall be maintained on the pier or wharf, preferably at the land end but in any case in readily accessible locations, a sufficient number of revolving nozzles, collar pipes, and other devices of appropriate type with the necessary supply of hose to permit establishing 2 complete water curtains across the pier or wharf, and at least 2 additional nozzles for extinguishing purposes.

(11) There shall be installed an adequate water supply and adequate hydrants or hose connections as determined by the *authority having jurisdiction* to supply sufficient water for the devices covered by this article.

Subdivision of combustible substructures

2.3.5.16.(1) Piers and wharfs having substructures of *combustible* construction shall have the under-deck area subdivided by

(a) fire walls having a fire resistance of 4 hr that

(i) are constructed transversely at intervals not exceeding 450 ft to be a continuation of the fire walls in the superstructure,

(ii) limit the area under the spacing in subclause (i) to 50,000 sq ft,

(iii) extend to the water line,

(iv) are free from holes, and

(v) extend to the outside edge of aprons or platforms built along the sides of the pier where such exist, and

(b) transverse fire stops located between fire walls so that

(i) spacing between fire walls and fire stops or between fire stops shall not exceed 150 ft,

(ii) there is a tight fit up against the pier deck and around structural members or pipes that pass through the fire stop so that an effective barrier to fire and draft will be maintained,

(iii) all fire stops extend to the low water line, and

(iv) where aprons or platforms are built along the sides of the pier the fire stops shall extend to the outside edge of such platforms.

(2) Where floods, tidal or wave action do not permit the construction of proper fire walls or fire stops, alternate measures for protecting piers and wharfs shall be provided that are acceptable to the *authority having jurisdiction.*

Sprinklers for superstructures

2.3.5.17.(1) All superstructures shall be provided with a complete system of automatic sprinklers, except that sprinklers shall not be required in small superstructures located over fire-resistive substructures if

(a) such superstructures do not exceed 500 sq ft in individual area,

(b) the total area of all such structures does not exceed 1500 sq ft, and

(c) the separation between any 2 such structures is not less than 30 ft.

Protecting exposures

2.3.5.18. When required by the *authority having jurisdiction* for the protection of exposures, an *approved* system of outside open sprinklers shall be installed on all superstructures.

First-aid fire appliances

2.3.5.19. Fire extinguishers, casks, pails or other first-aid fire appliances shall be installed, distributed, and their locations marked as required in subsection 2.1.8.

Water supply for fire protection

2.3.5.20.(1) A water supply system shall be provided for fire department use on or immediately adjacent to every pier or wharf.

(2) The capacity of the water system shall be sufficient to deliver the quantity of water determined to be necessary for fire fighting by the *authority having jurisdiction.*

(3) Pipes, pumps and other facilities shall be designed to deliver the required rate of flow.

(4) Hydrants or hose outlets shall be of sufficient number and adequately spaced to enable application of water to the structure without excessively long hose lines.

(5) Fire flow shall be designed for not less than 4-hr duration.

(6) Where pipe-lines are extended onto a pier to supply hydrants it is recommended that there also be installed on such pipe-lines hose outlets or standpipes for connection of small hose for use as first-aid fire protection.

Fire alarms

2.3.5.21. Fire alarm systems shall be installed and maintained in accordance with good practice,[30*] and be *approved* by the *authority having jurisdiction.*

*Superior number refers to the paragraph so numbered in the Advisory Reference Material.

2.3.6. PLASTICS MANUFACTURE AND FABRICATION

Scope

2.3.6.1.(1) This article shall apply to all plastics manufacturing or fabricating plants and is intended to provide minimum safety regulations covering the manufacture, fabrication, handling and storage of plastics materials, including the handling of raw materials.

(2) In order to provide some assessment of the degree of fire risk associated with the processing, storage or use of different types of plastics materials, plastics may be classified according to their order of flammability and burning characteristics in the following groups:

Group A – materials which are either *noncombustible* or self-extinguishing (burning ceases if the source of ignition is removed).

Group B – materials which burn with a feeble flame which may or may not propagate away from the point of ignition.

Group C – materials which burn at a rate comparable to cellulose acetate and which are more or less completely consumed.

Group D – materials which present a special and exceptionally high fire risk.

(3) Table A-1, Flammability Hazard of Plastics, in the Advisory Reference Material contains information on the working temperatures, flammability and burning characteristics of plastics materials, and an assessment of their flammability group is made on the assumption that all the materials are in the same form or state of division.

General Requirements

Permit

2.3.6.2.(1) A *permit* is required in accordance with Section 1.4.

Machinery

(2) All machinery used in the manufacture or fabrication of plastics materials shall be

(a) of an *approved* type,

(b) operated in conformity with the manufacturer's instructions,

(c) well maintained, frequently inspected and properly grounded,

(d) equipped with the necessary safety controls such as temperature controls, pressure relief valves, warning devices, explosion diaphragms, etc.

(3) All manufacturing and fabricating processes shall be conducted at the lowest practicable temperature.

Trained operators required

(4) All operators shall be well trained in the operation of the equipment or machinery for which they are responsible and shall be thoroughly instructed of the hazard potential of the materials involved in the manufacturing or fabricating process.

Hazardous areas

(5) In rooms or areas where flammable materials or hazardous chemicals are used or stored, or where dust-producing operations are carried out

(a) *smoking* and the use of naked lights or open flames shall be strictly forbidden,

(b) space heating if required shall be provided only by low-pressure steam or low-pressure hot water,

(c) all electrical equipment shall be either explosion proof or intrinsically safe, and

(d) all maintenance and repair work shall be properly supervised in order to ensure that any work involving the use of flame or the possible production of sparks is undertaken only after the room or area concerned has been rendered safe.

(6) The storage and handling of *cellulose nitrate plastics* shall conform to subsection 3.2.3.

(7) The storage, handling and use of *flammable liquids*, hazardous chemicals, or *combustible fibres* shall be in conformity with subsections 2.1.6., 3.2.5. and 3.2.7.

(8) All dust-producing operations shall be carried out in conformity with subsection 3.2.6.

(9) Proper precautions shall be taken to minimize spillage and unnecessary exposure of *flammable* volatile *liquids*.

(10) Metals and other foreign matter liable to cause sparking in grinding operations shall be removed from the plastics materials before they are ground.

Storage

2.3.6.3. Except for the storage of *cellulose nitrate plastics* which is covered by subsection 3.2.3., the storage of basic chemicals, raw materials, finished products and scrap materials shall be in accordance with the following:

(1) Hazardous chemicals and *flammable liquids* shall be stored in detached *buildings*, except that where the exposure hazard to adjacent property is negligible storage in the open may be acceptable. Such storage shall conform with subsections 2.1.6. and 3.2.5.

(2) The storage of raw materials, finished products and scrap materials in bulk shall be arranged in compartments separated from the manufacturing or fabricating plant by adequate fire-resistive construction.

(3) Where materials are stored on racks or shelves, such racks or shelves shall be of *noncombustible* construction.

(4) Bulk packing materials such as cartons and boxes shall be stored separately from plastics materials.

(5) Stacks of materials shall be kept in such a way that they are readily accessible, and open spaces around individual stacks shall be of sufficient width to restrict the spread of fire and provide easy access for fire fighting.

(6) The height of stacks shall be no greater than 10 ft except that a clear space of at least 2 ft shall in all cases be provided between the top of stacks and the ceiling.

2.3.6.4. *Buildings* in which plastics manufacture and fabrication take place shall be protected against fire as required by the *building bylaw.*[35*]

Portable extinguishers

2.3.6.5. *Portable extinguishers* shall be provided as required by subsection 2.1.8.

Standpipes

2.3.6.6.(1) At least one standpipe shall be provided on each floor with sufficient outlets that all of the *floor area* is protected by using not more than 75 ft of hose on each outlet.

(2) The number and distribution of standpipes shall be such that no part of a floor is more than 20 ft from a nozzle when the hose is fully extended.

(3) The water supply to standpipes shall be sufficient to deliver not less than 15 gal/min minimum at 15 psi through each nozzle having a 3/8-in. tip.

Fire alarm systems

2.3.6.7. Fire alarm systems shall be installed in plastics manufacturing and fabricating plants in accordance with good practice [34*] and be *approved* by the *authority having jurisdiction.*

2.3.7. DRY-CLEANING AND DRY-DYEING PLANTS

Scope

Exemption

2.3.7.1. This Code applies only to *dry-cleaning* plants where Class I, Class II or Class III systems are in use. Class IV systems shall be subject to the requirements for *permit* in Section 1.4 and shall be exempt from all other provisions of this subsection except for specific requirements herein stated.

Classification of equipment

2.3.7.2.(1) *Dry-cleaning* equipment designed for use with cleaning solvents having *flash points* below 100°F shall be known as Class I systems.

(2) *Dry-cleaning* equipment designed for use with cleaning solvents such as Stoddard solvent having a minimum closed-cup *flash point* of 100°F shall be known as Class II systems.

(3) *Dry-cleaning* equipment designed for use with cleaning solvents such as 140°F Flashpoint Solvent having a minimum closed-cup *flash point* of 138.2°F shall be known as Class III systems.

(4) *Dry-cleaning* equipment designed for use with nonflammable synthetic solvents shall be known as Class IV systems.

Dry-Cleaning Solvents

Use of solvents

2.3.7.3.(1) No solvent other than that specified for use in *dry-cleaning* operations shall be used in *dry-cleaning* equipment.

(2) Solvents for use in *dry-cleaning* systems shall be listed by Underwriters' Laboratories of Canada.

*Superior number refers to the paragraph so numbered in the Advisory Reference Material.

TABLE 2.3.7.A
Forming Part of Sentence (3)

Solvent Rating (Underwriters' Numerical Scale)†	Class of System
Above 40	Class I
40 or below††	Class II
25 or below	Class III
5 or below	Class IV

† "Classification of the Hazards of Liquids" by A. H. Nuckolls. Underwriters' Laboratories, Inc., Bulletin of Research No. 29, June 1943.
†† but not complying with Class III or Class IV requirements.

(3) Solvents listed by Underwriters' Laboratories of Canada shall be used in *dry-cleaning* systems according to Table 2.3.7.A.

Change of solvent

(4) A change shall not be made in the solvent used in the equipment in a *dry-cleaning* establishment to a solvent in a more hazardous class unless permission for the change has been obtained from the *authority having jurisdiction* and that authority shall approve the change only if the establishment or part thereof where the solvent is intended to be used is in strict conformity with the requirements of this Code pertaining to establishments in which the substituted solvent can be used.

Storage of solvents

(5) Solvents shall be stored and handled according to subsection 2.1.6.

Use of solvents

(6) No *dry-cleaning* system shall use *dry-cleaning* solvents with a solvent rating above 25, unless *approval* is obtained from the *authority having jurisdiction.*

(7) Subject to article 2.3.7.2., sentence (4), only *dry-cleaning* solvents rated 5 or below shall be used in Class IV *dry-cleaning* systems.

General Requirements for Class II and Class III Systems

Building requirements

2.3.7.4. *Dry-cleaning* plants using equipment classified as Class II or Class III shall be contained in a *building* meeting the requirements of the *building bylaw* [5]* for high hazard *occupancies.*

Responsibility of licensee

2.3.7.5. The licensee of a *dry-cleaning* establishment is responsible for fulfilling the provisions of this Code relating to the operation of *dry-cleaning* establishments and for taking all necessary precautions for the carrying on of *dry cleaning* and for seeing that all employees in the establishment are thoroughly instructed as to the hazards of their work and the precautions necessary for the preservation of life and property.

*Superior number refers to the paragraph so numbered in the Advisory Reference Material.

Electrical installations

2.3.7.6. *Dry-cleaning* plants using equipment classified as Class II or Class III shall have all electrical wiring and electrical equipment installed in the manner prescribed for Class I Hazardous Locations.

Static electricity

2.3.7.7.(1) All shafting and accessories, piping and metallic parts of a *dry-cleaning* machine and other parts liable to generate static electricity shall be properly grounded by at least No. 10 American Wire Gauge copper insulated wire.

(2) When pulleys and belting are used in a *dry-cleaning* room the danger of static electricity shall be mitigated by the installation of grounded combs or collectors or by other methods *approved* by the *authority having jurisdiction.*

(3) If after the apparatus and equipment have been grounded in accordance with sentence (1) it is found that static electricity accumulates in a *dry-cleaning* room, the atmosphere shall be humidified to such an extent as will counteract danger from fire and explosion.

Cleaning by immersion and agitation

2.3.7.8.(1) Subject to article 2.3.7.15. *dry cleaning* by immersion and agitation in open vessels is prohibited.

(2) *Dry cleaning* by immersion and agitation in a closed machine shall be carried on only with machinery and equipment designed, installed and operated in accordance with this Code.

(3) A machine for *dry cleaning* by immersion and agitation shall be liquid-tight and shall be furnished by the manufacturer with a name-plate indicating the class of solvent for which the machine is designed.

(4) The manufacturer of a machine for *dry cleaning* by immersion and agitation or his distributor or agent shall give written instructions to the buyer covering proper installation and safe operating methods of the machinery and solvent.

Tanks, Purifiers, Clarifiers and Filters

Solvent capacity

2.3.7.9.(1) Inside, above ground, processing equipment used in Class II and Class III systems that contains solvents shall have an individual capacity not in excess of 250 gal and shall not exceed in capacity any individual storage tank to which they may be connected.

(2) Tanks storing solvents for use in Class II and Class III systems shall not exceed more than 250 gal individual capacity, or more than 500 gal aggregate capacity in above ground storage tanks.

(3) The total solvent capacity of a plant using Class II and Class III systems during operation including inside above ground storage tanks shall not exceed 1000 gal.

(4) Purifiers, clarifiers and filters above ground and inside buildings, shall be securely mounted on rigid *noncombustible* supports

and be permanently and effectively grounded to dissipate static electricity.

Vent pipes

(5) Vent pipes shall be required from solvent storage tanks and purifiers in accordance with the requirements of subsection 2.1.6.

Liquid-level gauge

(6) Each above ground storage tank and processing unit shall be provided with a liquid-level gauge and each gauge glass, unless of *approved* duty type, shall be equipped with an automatic device which will immediately shut off the flow of solvent if the glass is broken.

(7) Liquid-level gauge glasses referred to in sentence (6) shall be reliably protected against physical damage.

Filters

(8) A pressure-type filter shall not be operated at a pressure exceeding that recommended by the manufacturer and shall be equipped with a reliable pressure gauge which shall be regularly checked for accuracy.

(9) Provision shall be made for bleeding air from filters using an air bleeding valve and line which shall discharge into the washer or storage tank and not into the room.

Pumps and Piping

Transfer of solvent

2.3.7.10.(1) In a *dry-cleaning* plant the transfer of solvent from the shipping or supply drums to the system during the initial charging, or whenever replenishing the solvent supply, shall be accomplished by utilizing either the system circulating pump and piping or a separate pump and piping so as to comply with subsection 2.1.6.

(2) The handling of solvents from the storage tank through the various machines and back to the settling and clear-solvent tanks shall be through closed circuits of piping.

(3) When underground treating and settling tanks are used a separate suction and discharge connection shall be provided to the pump for removal of sludge.

(4) When solvent transfer from supply drums through the system takes place the system shall have a common ground either by metallic contact or by conductive hose.

(5) Suction pipes shall be carried to the bottom of the settling tanks and discharge connections shall be connected to a suitable container in order that no solvent waste shall be discharged into a sewer.

(6) All pumps handling solvent shall be designed for use with hazardous liquids.

(7) Each pump of the positive displacement type shall be fitted with a relief valve and by-pass set so as to prevent excessive pressure.

Sight glasses

(8) Sight glasses, the breakage of which would permit the escape of *flammable liquids*, shall be of a type not readily damaged by heat and shall be reliably protected against physical damage.

Materials

(9) Piping, valves, fittings and ground-joint unions shall be of steel or other material suitable for use with the solvent used and shall be designed for the working pressures and structural stresses to which they may be subjected.

Cast iron fittings

(10) Cast iron fittings for pressure piping are prohibited.

(11) Pipe systems shall be substantially supported and protected against physical damage and excessive stresses arising from settlement, vibration, expansion or contraction.

Valves

(12) Pipe systems shall contain a sufficient number of valves to operate the system properly and to protect the plant.

Pressure test

(13) Piping shall be tested to a minimum pressure of at least 50% in excess of its normal operating pressure and proven tight.

Sludge removal

(14) Sludge removed from traps in filters and stills shall be placed in tightly covered metal containers and immediately removed from the *building* to a safe disposal point.

Washing Machines

Class II and Class III systems

2.3.7.11.(1) In Class II and Class III systems each washing machine shall be of substantial construction and shall be provided with splash-proof doors to prevent leakage of solvent and with interlocks to prevent cylinder rotation under power, except for inching, when doors are open.

(2) Each washing machine shall be securely attached to the floor and the cylinders and shells of the machine shall be permanently and effectively grounded to dissipate static electricity.

Grounding

(3) The grounding of the cylinder of each washing machine shall be through the trunnion shaft and where a wooden cylinder is used grounding shall be across the inner surface of the cylinder.

Overflow pipe

(4) Each washing machine shall be provided with an overflow pipe one size larger than the size of the solvent supply line to the machine.

(5) The overflow pipe of a washing machine shall be connected to the shell of the washer so that the top of the overflow is below the bottom of the trunnion shaft; it shall be without shut-off valves and shall be arranged to discharge to a suitable tank.

Supply pipe

(6) The supply pipe to a washing machine whether from pumps, filters or storage tanks, shall enter the washing machine above the charged liquid level.

Buttons and lint traps

(7) Individual button and lint traps shall be provided for each washer.

Extinguishing equipment

(8) In Class II systems each washing machine shall be provided with *approved* extinguishing equipment arranged to operate automatically in case of fire consisting of a carbon dioxide system or a steam jet not less than 3/4 in. with a continuously available steam supply at a pressure of not less than 15 lb/sq in.

Stills and Condensers

2.3.7.12.(1) In stills and condensers used in Class II and Class III systems, stills and condensers shall be of substantial construction, mounted on substantial *noncombustible* supports and shall be liquid- and gas-tight. Class II and Class III systems

(2) Steam or hot water only shall be used as the source of heat. Heating

(3) Each steam system shall have a pressure-regulating valve installed in the steam supply line to the still downstream from the reducing valve.

(4) Each still shall be designed for operation on the vacuum principle and shall be provided with a combination vacuum and pressure gauge.

(5) Each still shall be provided with a pressure relief valve piped outdoors to a location for safe discharge except where such a valve interferes with the operation of the still in which case the relief valve may be omitted and a limit switch installed in the still arranged to shut off the steam supply if safe operating temperatures are exceeded.

(6) Check valves shall be installed in the steam line between the boiler and the still.

(7) Each still shall be equipped with a constant level valve to automatically maintain the solvent liquid level in the still at the proper height.

Drying Tumblers and Drying Cabinets

2.3.7.13.(1) Drying tumblers used in Class II systems shall be of substantial construction, well secured to substantial foundations provided with self-closing explosion hatches arranged to open away from the operator and having an area equal to at least 1 sq ft for each 30 cu ft of cylinder volume. Class II and Class III systems

(2) Drying tumblers used in Class II systems shall be provided with a steam jet of not less than 3/8 in. pipe size for humidifying during the drying process and with *approved* extinguishing equipment as specified in article 2.3.7.10., sentence (8).

(3) Drying tumblers and drying cabinets used in Class III systems shall be constructed so that the solvent is removed from the fabrics and the machine by evaporation and dilution with heated air flow without the formation of flammable mixtures of vapour and air.

(4) A motor-driven fan for inducing air flow, heating coils and the necessary automatic controls and interlocks shall be integral parts of the drying machines used in Class III systems.

(5) Drying tumblers and drying cabinets used in Class III systems shall be provided with automatic devices to lock the door in the closed position if the temperature exceeds the *flash point* of the solvent and to flood the interior of the drying tumbler or cabinet with steam in the event of electric power failure.

(6) The cylinders and shells of all drying tumblers and the walls of drying cabinets used in Class II and Class III systems shall be permanently and effectively grounded through the trunnion shaft to dissipate static electricity.

Ventilation of Class II and Class III systems

(7) Drying tumblers and drying cabinets used in Class II and Class III systems shall be ventilated to the outside air by means of properly constructed pipes or ducts connected to an exhaust fan of sufficient capacity to remove all dust, vapours or lint generated by the process, except that in Class III systems the fan incorporated in the machine may be used for that purpose.

(8) The ventilating fan for drying tumblers and drying cabinets used in Class II and Class III systems shall be properly housed and so interlocked as to ensure operation while the drying tumbler is in use; the fan spiders, blades or running rings shall be constructed of non-ferrous metal and in no case shall the fan motor be mounted within the ventilating duct.

(9) Ventilating pipes from drying tumblers and drying cabinets used in Class II and Class III systems shall be carried to a height of not less than 6 ft above the roof of the *building* containing the *dry-cleaning* equipment and shall not terminate within 10 ft measured horizontally from any door, window or frame walls of any adjoining or adjacent *building*.

(10) Ventilating ducts in Class II and Class III systems shall be provided with clean-out facilities.

(11) Drying tumblers used in Class II and Class III systems shall be provided with interlocks so that the cylinders cannot be power-driven while the access door is open.

(12) Opening the access door of drying tumblers used in Class II and Class III systems shall automatically stop the cylinder drive motor.

Extractors

Supports

2.3.7.14.(1) An extractor shall be of substantial construction and securely attached to rigid *noncombustible* supports.

Baskets

(2) The baskets used in an extractor shall have a rim of nonferrous metal and shall be well balanced.

Cover

(3) An extractor shall be provided with a liquid-tight cover, preferably of nonferrous metal, or it shall be designed so that none of the liquid solvent is thrown out of the extractor while it is in operation.

(4) The cover of an extractor shall be equipped with automatic mechanical or electrical interlocks which will prevent the operation of the extractor while the cover is open and which will prevent the opening of the cover until the basket comes to rest.

Drain

(5) An extractor shall be provided with a drain pipe not less than 1 1/2 in. in diameter connected directly to underground storage tanks or to a suitable above ground container or to the washer through an *approved* extractor pump with connections fitted with proper valves.

(6) The outside shell of an extractor shall be permanently and effectively grounded for dissipation of static electricity. Grounding

(7) The brakes of an extractor shall be so designed as to prevent the creation of sparks or excessive heat. Brakes

(8) An extractor shall not be operated at a speed in excess of that prescribed by the manufacturer as shown on the name-plate which shall be fastened on each machine. Operating speed

(9) An extractor may be equipped with a solvent spray nozzle for the spray rinsing of garments after the primary extraction. Spray rinsing

(10) Solvent spray rinse equipment may be installed on extractors at present in use in a *dry-cleaning* plant only when specific *approval* of the *authority having jurisdiction* is obtained and the following requirements are complied with:

(a) the extractor cover shall be made splash-proof to prevent leakage of the solvent and shall be equipped with a latch to hold the cover closed during operation,

(b) the supply pump shall be of an *approved* type and, if of a positive displacement type, shall be provided with a by-pass and relief valve so set as to prevent excessive pressure,

(c) where the solvent line is connected to the nozzle at the cover, *approved* conductive-type flexible hose may be used if it is of reinforced construction of a material suitable for the solvent handled and arranged to prevent excessive flexing,

(d) valves in the supply line between the pump and outlet shall be installed in such a manner that the cut-off is effected ahead of any flexible portion of the supply line, Valves

(e) regardless of the intended use or number, extractor drain lines shall not be less than 2 in. for extractors up to and including 40 in. in diameter, and not less than 3 in. for extractors in excess of 40 in. in diameter, Drain lines

(f) an extractor shall be provided with at least one drain line open at all times,

(g) if more than one extractor drain line is provided for the purpose of alternating use, quick-opening valves or the equivalent thereof shall be installed in each line and arranged to operate opposite or simultaneously,

(h) a separate extractor drain tank shall have a capacity equal to the total quantity of the charged solvent extraction, the rinse and rinse extraction, and

(i) drainage from an extractor to a tank shall be by gravity flow.

(11) A combination *dry-cleaning* unit wherein the washing and extracting cycles are completed within the same enclosure shall, in addition to complying with the requirements of this section applicable to washing machines and to extractors when used as separate units, be in accordance with the following: Combination dry-cleaning units

(a) the machine shall be securely attached to the floor and when necessary a special foundation shall be provided to prevent

transmission to surrounding areas of stresses resulting from high-speed operation during extraction,

(b) the machine shall be provided with braking means to ensure stoppage of the cylinder within a reasonable time without the creation of sparks or excessive heat,

(c) the interlocking device on the splash-proof door shall ensure that during the extracting cycle opening of the door or cover will disconnect the drive motor and apply brakes to bring the cylinder to rest before access to the cylinder is possible,

(d) the supply pipes to a machine whether from pumps, filters or storage tanks shall be arranged to deflect the solvent stream away from tub openings,

(e) the cylinder shall be supported so as to provide sufficient clearance to prevent striking or rubbing adjacent parts during rotation, and

(f) the machine shall be furnished with automatic or manual means for control of all operating cycles of the unit.

Spotting, Brushing and Spray Dyeing

Solvents

2.3.7.15.(1) All scouring or brushing and *spotting* operations shall if possible be conducted with liquids or solvents of the same fire hazard classification or rating as the solvent used in the plant *dry-cleaning* machines, but solvents having a higher hazard rating may be used in quantities not exceeding a total of 1 gal when dispensed from *approved* safety cans; additional storage shall be in *approved* safety cans of not over 1 gal capacity.

(2) Scouring or brushing operations which use more than 1 gal of solvent shall be conducted only in a room or *building* conforming to all the requirements for a *dry-cleaning* system using the same type of solvent.

Brushing table

(3) The brushing table shall have a liquid-tight top with a curb on all sides not less than 1 in. high.

(4) The top of the brushing table shall be so pitched as to secure thorough draining to a 1 1/2 in. drain connected to a container acceptable to the *authority having jurisdiction* which is especially provided and marked for that purpose.

Scrubbing tubs

(5) An article the character of which prevents its washing in washing machines, may be cleaned in an *approved* scrubbing tub if the total amount of solvent used in the open container does not exceed 3 gal.

(6) A scrubbing tub shall be secured to the floor and shall be provided with permanent 1 1/2 in. trapped drains to a container acceptable to the *authority having jurisdiction* which is especially provided and marked for that purpose.

(7) The scouring or brushing table or scrubbing tub shall be so located as to ensure thorough and effective disposal of vapours through the ventilating system.

(8) *Spotting*, brushing and spray dyeing by the use of *flammable liquids* shall not be done in a room or enclosure where there is an open flame, light or spark.

(9) Spray dyeing shall be carried on only in an *approved spray booth.*

Operating Requirements

2.3.7.16.(1) A machine shall be operated in accordance with operating instructions furnished by the manufacturer and each employee shall be thoroughly instructed as to the hazards involved in his department and in the work which he performs.

(2) Clothing shall be thoroughly searched in the receiving room and all foreign materials, especially matches and metallic substances, removed.

(3) Provision shall be made for minimizing the dripping of solvent on the floor when removing clothes from the washer.

(4) When clothes are transferred from a washer to a drain tub, a non-ferrous metal drip apron shall be so placed as to rest on the drain tub and the cylinder of the washer.

(5) *Flammable liquids* shall be thoroughly drained off from any machine used in *dry-cleaning* operations and returned to the storage tank at the close of each day's operation.

(6) Clothes shall not be left in a washer, extractor or dryer overnight.

(7) Lint and refuse shall be removed from the traps after the close of the day's work, deposited in *approved* waste cans, removed from the premises, and disposed of safely.

(8) Trap covers shall be fastened securely in place at all times except when cleaning operations are in progress.

(9) *Flammable liquids* having a *flash point* less than 200°F shall not be used for cleaning floors.

(10) Where a ventilating system is installed it shall be shut down immediately upon the discovery of a fire.

(11) Periodic inspections of the valves and piping of the steam or other extinguishing system shall be made in order that reliable operation may be assured.

(12) Steam lines shall be tested periodically.

2.3.7.17. *Fire protection equipment* shall be provided in accordance with subsections 2.1.6. and 2.1.8. and in addition areas in which Class I, Class II, or Class III *dry-cleaning* systems are located shall be protected by automatic sprinkler systems designed for extra hazardous *occupancies* in accordance with good practice.[33*]

Fire protection equipment

*Superior number refers to the paragraph so numbered in the Advisory Reference Material.

2.3.8. BOWLING ALLEYS

Permit

2.3.8.1. A *permit* shall be obtained in accordance with Section 1.4.

Alley resurfacing operations

2.3.8.2.(1) The operator of *bowling alleys* shall notify the *authority having jurisdiction* when the alleys are to be resurfaced.

(2) The resurfacing of *bowling alleys* shall not be carried on while the establishment is open for business.

(3) Ventilation shall be provided to maintain the atmosphere below toxic level when a *bowling alley* is being resurfaced.

(4) Heating, ventilating or cooling systems employing recirculation of air shall not be operated in a *bowling alley* during resurfacing operations or within 1 hr following the application of flammable finishes.

(5) All electric motors and other equipment in a *bowling alley* which might be a source of ignition shall be shut down and *smoking* and the use of open flames or lights are prohibited during the application of flammable finishes and for 1 hr thereafter.

Pin refinishing

2.3.8.3.(1) Pin refinishing involving the application of flammable finishes shall be permitted only in rooms separated from the remainder of the *building* by a 2-hr fire separation, or they shall have equivalent protection in accordance with *approved* standards of safe practice. Rooms shall not be located below grade or communicate with any pits, wells, pockets, *cellars* or *basements*.

(2) Storage of *flammable liquids* in pin-refinishing rooms shall not exceed a combined aggregate of 50 gal in original metal containers or *approved* safety containers not exceeding 5 gal individual capacity.

(3) A metal waste can with self-closing cover shall be provided in a pin-refinishing room for all waste materials and rags which shall be removed from the can daily.

(4) No *person* shall smoke in a refinishing room.

(5) Pin-refinishing operations shall not be carried out while the *building* or any intercommunicating *building* is in use.

2.3.9. INDUSTRIAL OVENS FOR BAKING AND DRYING PROCESSES

Scope

2.3.9.1. This Code shall apply to the location, design, construction and operation of industrial baking and drying ovens which are heated with oil or gas fuel or which during operation contain flammable vapours given off by the products being baked or dried. The ovens referred to in this Code will generally but not necessarily operate at 700°F or less.

Location

2.3.9.2.(1) Ovens, oven heaters and related equipment shall be located with due regard to the possibility of fire or explosion resulting from overheating or from the escape of the heating medium with subsequent ignition.

(2) Ovens shall not be located in *cellars* and *basements*.

Construction

2.3.9.3.(1) Industrial ovens shall be constructed of *noncombustible* materials with interiors of smooth surfaces arranged to permit cleaning.

Roof and floors

(2) Roof and floors of ovens and heaters shall be sufficiently insulated and space above and below sufficiently ventilated to keep the temperature less than 160°F where *combustible* ceilings and floors exist.

(3) Floors at ovens and heaters which operate at 300°F or greater shall be insulated with material equivalent in insulating value to that used for oven walls and roof.

Explosion vents

(4) Explosion vents shall be provided for ovens where fuel or vapour hazards are present and shall have a venting ratio of 1 sq ft for each 15 cu ft oven volume.

(5) Openings or access doors equipped with *approved* explosion release hardware shall be acceptable in determining the venting ratio for explosion vents.

Ducts

(6) Ducts shall be of *noncombustible* construction with sufficient *noncombustible* insulation to prevent the temperature from exceeding 160°F at *combustible* ceilings, floors, walls and roofing.

(7) Exhaust ducts shall not discharge near doors, windows, or other air intakes in a manner that will permit re-entry of vapours into the *building*.

(8) Metal circulating ducts or exhaust ducts or stacks shall not pass through fire walls.

Shut-off valves

2.3.9.4. Each gas- or oil-fired oven shall be provided with a manually operated fuel shut-off valve so located that the valve will not become inaccessible due to a fire or other emergency.

Electrical system

2.3.9.5.(1) The electrical components shall be installed as required by article 2.1.4.15. having regard for the hazardous nature of the installation.

(2) Adequate grounding shall be provided at safety control circuits and adequate precautions shall be taken to ensure safe dissipation of static electricity.

(3) Maintenance shall be on a complete and rigid schedule providing adequate inspection and care of the complete installation.

Ventilation

Ovens

2.3.9.6.(1) Ovens in which flammable or toxic vapours are liberated or through which products of combustion are circulated shall be ventilated by the introduction of a supply of fresh air and proper exhaust to outdoors.

(2) Sufficient ventilation shall be furnished at all times to a continuous oven to dilute the flammable volatiles to concentrations down to 25% or less of the lower explosive limit.

(3) The work chamber of direct internal-fired and direct external-fired ovens shall be mechanically ventilated to outdoors so as to dispose safely of the products of combustion.

Pre-ventilation period required

(4) A pre-ventilation period prior to ignition shall be required.

(5) The pre-ventilation period shall be sufficient to provide at least 3 volume changes for all oil- and gas-fired ovens (except indirect-fired not exceeding 350 cu ft volume) to purge the work chamber of any fuel.

Safety exhaust ventilation

(6) Ovens in which flammable or toxic vapours are liberated or through which products of combustion are circulated shall be provided with safety exhaust ventilation.

(7) Batch ovens shall be provided with safety exhaust ventilation at the rate of 380 cu ft/min of fresh air referred to 70°F for each gallon of flammable volatile introduced in the largest work load with dampers if any set in the maximum throttling position.

(8) In the case of continuous process ovens, safety exhaust ventilation shall be at least 10,000 cu ft of fresh air referred to 70°F for each gallon of flammable volatile entering the oven at the maximum loading rate with dampers at the maximum throttling position.

(9) Exhaust duct openings shall be located in the area of greatest concentration of vapours.

(10) All exhaust shall be by mechanical means using power-driven fans.

Safety Controls

2.3.9.7.(1) *Approved* fuel safety shut-off valves shall be provided for main and pilot burners at each oven zone.

Combustion safeguards

(2) *Approved* combustion safeguards shall be provided at gas- and oil-fired ovens to supervise the burner flames and to prevent accumulation of unburned fuel-air mixtures in the oven work chamber in event of accidental flame failure.

(3) Combustion safeguards may not be required at indirect-fired ovens where heating systems are explosion resistant or at multi-gas burner direct internal-fired ovens where the number of burners or their design or their firing rate make such safeguards unpractical.

(4) Excess temperature controls designed to "fail safe" and requiring manual reset shall be provided in addition to any automatic or manual control and shall be arranged to shut down and lock out the source of heat when temperatures rise more than 50°F above the operating temperature of the oven.

(5) An oven or dryer which is not constantly attended when the heat is on shall be provided in addition to a temperature-limit switch with an excess-temperature alarm so located as to attract the attention of watchmen or others.

Interlocks

2.3.9.8.(1) In continuous ovens where flammable volatiles are introduced, interlocks for fans, conveyors and heating systems shall be provided to ensure that

(a) all safety fans are placed in operation before conveyors are started, and

(b) failure of any fan will automatically stop the conveyor, close safety shut-off valves and de-activate ignition in event of failure of the ventilating fan.

(2) In batch-type ovens interlocks shall be provided to close safety shut-off valves and de-activate ignition in event of failure of the ventilating fan.

2.3.10. GARAGES

Construction, use and occupancy

2.3.10.1. The construction, use and *occupancy* of *garages* shall conform to the requirements of the *building bylaw*.[36*]

Handling of gasoline and oil

2.3.10.2.(1) *Flammable liquids* shall be stored and handled in accordance with subsection 2.1.6.

(2) The fuel tanks of *motor vehicles* shall be filled directly through hose from *approved* pumps attached to *approved* portable tanks or drawing from underground storage tanks.

(3) The dispensing of gasoline shall not take place inside *buildings*, or the facilities for dispensing shall not be installed in any *building*.

(4) Gasoline shall not be transferred from or into an open container within a *garage*.

(5) A *garage* floor shall drain to an oil separator or trap discharging to a sewer.

(6) The contents of an oil separator or trap of a floor drainage system shall be collected at sufficiently frequent intervals to prevent oil from being carried into the sewers and removed from the premises.

(7) Self-closing metal cans shall be used in a *garage* for all oily waste or waste oils.

Storage of explosives and flammable materials

2.3.10.3.(1) In a public *garage* no *person* shall keep, store, use or cause or permit to be kept, stored or used any *combustible*, *explosive* or flammable material

(a) under a stairway or fire escape or in an elevator shaft,

(b) on the roof of or adjacent to any *building* used or maintained as a public *garage* in such a way as to create a fire hazard or restrict the fire department's access to the *building* in any way, or

(c) in any other part of the *building*.

*Superior number refers to the paragraph so numbered in the Advisory Reference Material.

Portable extinguishers

2.3.10.4. *Portable extinguishers* shall be provided in accordance with subsection 2.1.8.

2.3.11. SERVICE STATIONS

Scope

2.3.11.1. This Code applies to the location of *service stations* with regard to *flammable liquid bulk* storage *plants*, the storing and handling of *flammable liquids*, operation of *dispensing apparatus*, control of drainage and sources of accidental ignition known to cause fires.

Definition

2.3.11.2. In this subsection a *service station* means a *building* or place where petroleum products, anti-freeze, and other sundry products for maintaining automobiles are stored or kept for sale, or where *motor vehicles* may be oiled, greased or washed and otherwise receive minor servicing or running repairs essential to the actual operation of *motor vehicles*.

Locations with regard to a bulk plant

2.3.11.3. *Apparatus dispensing Class A flammable liquids* into the fuel tanks of *motor vehicles* of the public shall not be located at a *bulk plant*.

General storage of flammable liquids

2.3.11.4. *Flammable liquids* shall be stored according to the requirements of subsection 2.1.6.

Flammable liquid storage inside buildings

2.3.11.5.(1) *Class A flammable liquids* other than packaged items for resale shall not be stored or handled within a *service station building*.

(2) *Class A flammable liquids* stored for resale shall be in unbroken metallic containers of not over 1 gal capacity each.

(3) *Class B flammable liquids* may be stored and dispensed inside a *service station building* from *approved* containers of not more than 45 gal capacity each. Where a single container of greater capacity is necessary for storage purposes it shall be installed in accordance with article 2.1.6.8.

(4) A container equipped with an *approved* pump or self-closing faucet shall be considered a *closed container* for purposes of storage only.

Labels required

2.3.11.6. *Class A* or *Class B flammable liquids* shall not be sold or bought in containers unless the containers are clearly marked with the name of the product contained therein.

Portable containers

2.3.11.7. *Class A flammable liquids* shall not be dispensed into a portable container unless such container is a *safety can* or other *approved* metallic container.

Dispensing Apparatus

Location of dispensing apparatus

2.3.11.8.(1) The fuel *dispensing apparatus* at a *service station* shall be so located that all parts of a *motor vehicle* being served will be on private property.

(2) Fuels shall be transferred from tanks by means of fixed pumps so designed as to allow control of the flow and to prevent leakage or accidental discharge.

(3) *Dispensing apparatus* shall be designed so that the pump will only operate when the dispensing nozzle is removed from its bracket on the dispensing unit and the switch on the dispensing unit is manually actuated. This control shall also stop the pump when the nozzle has been returned to its bracket.

(4) A switch shall be provided, readily accessible at all times, to shut off the power to pumps in case of fire or other emergency.

Self-service

2.3.11.9. The installation and use of coin-operated *dispensing apparatus* for *Class A flammable liquids* is prohibited.

Supervision

2.3.11.10.(1) The dispensing of *Class A flammable liquids* into the fuel tank of a vehicle or into a container shall at all times be under the control of a competent *person.*

(2) A *person* shall not use a dispensing device for *Class A flammable liquids* which continues dispensing *Class A flammable liquids* when the hand of the operator is removed from the nozzle control lever, except when an automatic nozzle is used in accordance with article 2.3.11.11., sentence (1).

Automatic nozzles

2.3.11.11.(1) An *approved* automatic nozzle may be used in accordance with this section for dispensing *Class A flammable liquids* into the fuel tank of a *motor vehicle.*

(2) An automatic nozzle shall have the latch-open device as an integral part of the assembly and shall shut off the liquid reliably and positively.

(3) A competent attendant shall be in the immediate vicinity of a *motor vehicle* while the fuel tank is being filled by an automatic nozzle.

Sources of Ignition

Drainage

2.3.11.12.(1) In an area where *Class A flammable liquids* may be spilled, provisions shall be made by the grading of driveways, raising of door sills or other equally effective means to prevent those liquids from flowing into the interior of *service station buildings.*

(2) Crankcase drainings and *flammable liquids* shall not be dumped into sewers but shall be stored in underground tanks outside of any *building* until removed and disposed of in an *approved* manner.

Restriction on cellars, basements or pits

2.3.11.13. *Class A flammable liquids* shall not be stored or handled within a *building* having a *cellar, basement* or pit into which flammable vapours may travel unless the *cellar, basement* or pit is provided with ventilation designed to prevent the accumulation of flammable vapours therein.

Smoking

2.3.11.14. *Smoking* on *service station* premises shall be regulated according to article 2.1.4.14.

Engine shut down

2.3.11.15. Two-way signs shall be posted at pump islands requiring that the motor be shut off during refuelling operations. The posting shall be such that the signs are easily seen by the driver of a *motor vehicle* approaching either side of the island.

Portable extinguishers

2.3.11.16. *Portable extinguishers* shall be provided in accordance with subsection 2.1.8.

2.3.12. MARINE SERVICE STATIONS

Approved dispensing apparatus

2.3.12.1. *Class A flammable liquids* shall be dispensed only with *dispensing apparatus approved* by the *authority having jurisdiction.*

Locating dispensing apparatus

2.3.12.2. All *dispensing apparatus* for *flammable liquids* shall be located outside of the berthing area.

Locating tanks and pumps

2.3.12.3. Tanks and pumps other than those integral with *approved apparatus dispensing Class A flammable liquids* shall be located only on shore.

Locating approved dispensing apparatus

2.3.12.4. *Approved dispensing apparatus* with integral pumps shall be located on shore, piers of solid-fill type, open piers, wharfs or floating docks.

Dispensing Class B flammable liquids

2.3.12.5. Tanks and pumps supplying *Class B flammable liquids* at *marine service stations* shall be located on shore or on a pier of solid-fill type.

Tank barge connections

2.3.12.6. Tank barge connections for filling storage tanks shall be located outside of the berthing area.

Storage tanks

2.3.12.7. Storage tanks containing *flammable liquids* for *marine service stations* shall be subject to all requirements of subsection 2.1.6.

Dispensing flammable liquids

2.3.12.8.(1) *Class A flammable liquids* shall not be dispensed into the fuel tanks of marine craft except by means of a hose equipped with a self-closing nozzle and with a valve which must be held open by manual control while making a delivery.

(2) The dispensing of *Class B flammable liquids* from tank trucks into the fuel tanks of marine craft shall be subject to the *approval* of the *authority having jurisdiction.*

Pipe-lines

2.3.12.9.(1) Pipe-lines at *marine service stations* where attached to piers, wharfs, or other structures shall be protected against physical damage.

(2) A valve shall be provided in each line at or near the approach to a pier, wharf, or other structure whereby supply from shore may be shut off.

PART 3 EXTREME HAZARDS

SECTION 3.1 GENERAL

3.1.1. SCOPE

3.1.1.1. Part 3 of this Code is intended to deal with materials which are likely to burn with extreme rapidity or which may produce poisonous fumes or gases, including toxic or highly corrosive substances which involve flame, *explosive*, poisonous, irritant or corrosive hazards; also uses that cause division of material into fine particles or dust subject to explosion or spontaneous combustion.

SECTION 3.2 HAZARDOUS MATERIALS

3.2.1. MATCHES

3.2.1.1. A *permit* to manufacture and to store matches shall be obtained in accordance with Section 1.4. — Permit

Storage

3.2.1.2. At a wholesale establishment and wherever matches exceeding 60 matchman's gross are stored, shipping cartons containing matches shall be arranged in piles not exceeding 10 ft in height nor 1500 cu ft in volume with aisles at least 4 ft wide. — Wholesale establishments

3.2.1.3. Where other materials or commodities are stored on the same floor with matches a portion of the room shall be devoted to match storage exclusively, and a clear space of not less than 4 ft maintained between match storage and such other materials or commodities. — Space separations

3.2.1.4. No matches shall be stored within 10 ft of any open elevator shaft, elevator shaft opening, open stairway or other vertical opening. — Vertical openings

3.2.2. FIREWORKS

3.2.2.1.(1) *Firework* comprises *firework composition* and *manufactured fireworks*. — Definitions

(2) *Fireworks composition* means any chemical compound or mechanically mixed preparation of an *explosive* or flammable nature that is used for the purpose of making *manufactured fireworks*.

(3) *Manufactured fireworks* means an *explosive* of any class, as defined by the *Explosives Act* and regulations thereunder, and any *firework composition* that is enclosed in a container or contrivance for the purpose of producing an audible or visible signal.

(4) *Shop goods* means *manufactured fireworks* that are not liable to violent explosion such as *firework* showers, fountains, golden

rain, lawn lights, pinwheels, Roman candles, sparklers, toy caps; volcanoes, firecrackers of gunpowder composition not exceeding 2 in. in length and 1/4 in. in diameter, and mines not exceeding 1 lb gross weight. *Shop goods* does not include rockets or salutes or any other type of *fireworks* not authorized for retail sale under the *Explosives Act* and regulations thereunder.

Storage

3.2.2.2.(1) The storage of *manufactured fireworks* shall not exceed

(a) 250 lb in a separate store or *warehouse*, or

(b) 50 lb in an *approved* container.

(2) The storage of any *explosive* other than *small arms ammunition* on the same premises with *fireworks* is prohibited.

(3) *Shop goods* for sale or display on a mercantile premises shall be

(a) in a *closed container* such as a box, glass case or other suitable receptacle,

(b) separated from general goods and matches, and

(c) protected from direct action of the sun's rays.

(4) For storage purposes only, 3 lb gross weight of *shop goods* may be considered the equivalent of 1 lb of *manufactured fireworks*.

(5) *Manufactured fireworks* obtained for immediate use by a responsible *person* for an authorized public display may exceed in quantity that permitted in article 3.2.2.2. when the place of storage is

(a) situated according to the requirements of Table 3.2.4.A,

(b) constructed so as to prevent unauthorized entry,

(c) clean and adequately ventilated, and

(d) placarded to warn *persons* of the *explosive* contents and the danger from open lights, *smoking* and the use of spark-producing tools inside the structure.

(6) *Magazines* for the storage of *fireworks* shall conform to Part IX of the *Explosives Act* and regulations thereunder.

Sale

3.2.2.3. No *person* shall sell, give or furnish to a *person* under the age of 16 years any *fireworks* or material used or intended to be used for *fireworks* whether for his own use or not. The foregoing does not apply to parents supplying fireworks to their own children for use under their own supervision.

Public display

3.2.2.4.(1) A *permit* shall be obtained authorizing the display of *fireworks* in accordance with Section 1.4.

(2) Public display of *fireworks* shall be permitted only when the actual point at which the *fireworks* are to be fired is at least 200 ft from the nearest permanent *building*, public *highway* or railway, or other means of travel, or 50 ft from the nearest above ground telephone or telegraph line, tree, or other overhead obstruction.

(3) The *persons* in actual charge of the firing of *fireworks* in a public display shall be able-bodied men of at least 21 years of age and competent for the task.

(4) There shall be at all times at least 2 operators of the display constantly on duty during the discharge.

(5) The audience at a public display of *fireworks* shall be restrained behind lines at least 150 ft from the point at which the *fireworks* are discharged and only *persons* in active charge of the display shall be allowed inside these lines.

(6) Any *fireworks* that remain unfired after the display is concluded shall be immediately disposed of in a manner safe for that particular type of *fireworks*.

(7) No *fireworks* display shall be held during any wind storm in which the wind reaches a velocity of more than 30 miles/hr.

3.2.2.5.(1) All *fireworks* that fire a projectile shall be so set up that the projectile will go into the air as nearly as possible in a vertical direction. Projectiles

(2) Where such *fireworks* are to be fired beside a lake or large body of water they may be directed in such a manner that the falling residue from the deflagration will fall into the water.

3.2.2.6. At least 2 *approved* fire extinguishers of at least 2 1/2 gal capacity each shall be kept at as widely separated points as possible within the actual area in which *fireworks* are to be discharged. Extinguishers for discharge area

3.2.3. CELLULOSE NITRATE PLASTICS

3.2.3.1. The storage and handling of cellulose nitrate in any form shall be subject to the requirements for a *permit* contained in Section 1.4. Permit required

3.2.3.2.(1) All displays of *cellulose nitrate plastics* articles in stores shall be in show-cases or show-windows except that Display of plastics

(a) articles may be placed on tables or counters, but no table or counter shall be over 3 ft wide and 10 ft long, and tables and counters shall be spaced at least 3 ft apart,

(b) spaces underneath tables or counters shall be kept free of storage of any kind and of accumulation of paper, refuse and other *combustible* material, and

(c) sales or display areas shall be so located that in the event of a fire at a table or counter there shall be no interference with free *exit* from the room, in at least one direction.

(2) No light (electric, fluorescent or gas) shall be located directly above any *cellulose nitrate plastics* material.

3.2.3.3.(1) Areas where *cellulose nitrate plastics* are stored shall have vents and doors so arranged that escaping decomposition gases produced by the plastics will be directed to a safe location. Storage areas

(2) Storage areas designed to prevent uncontrolled dispersion of decomposition gases must have no unnecessary openings.

(3) Raw material shall be stored in areas reserved for the purpose and shall under no circumstances be mixed with other materials.

Storage cabinets and vaults

3.2.3.4.(1) Where *cellulose nitrate plastics* in excess of 25 lb is received in any *building* or fire area an *approved* vented cabinet or a vault shall be provided for the storage of this material.[37]*

(2) Not more than 1000 lb of raw material may be stored in cabinets in any one work-room, but not more than 500 lb in any one cabinet, nor more than 250 lb in one compartment of the cabinet.

(3) All raw material in excess of that permitted in sentence (2) shall be kept in vented vaults not exceeding 1500 cu ft capacity.

(4) No *cellulose nitrate plastics* shall be stored within 2 ft of any heat-producing appliances, steam pipes, radiators or *chimneys*.

Factory storage

(5) In factories manufacturing articles of *cellulose nitrate plastics* such sprinklered and vented cabinets, vaults or storage rooms shall be provided as may be necessary to prevent the accumulation in work-rooms of raw stock, stock in process or finished articles.

Manufacturing

Tote boxes required

3.2.3.5.(1) In the work-rooms of factories where *cellulose nitrate plastics* is being processed, operators shall not be stationed closer together than 3 ft.

(2) During process of manufacture and until packed in shipping cartons or boxes, materials and articles of *cellulose nitrate plastics* not in finished-stock store-rooms, raw material vaults or cabinets shall be kept in tote boxes except when on tables, work-benches, at machines, or being worked upon.

Material limited

(3) Material that may be placed upon tables, work-benches or at machines shall be limited in quantity to the amount required per operator for a 1/2-day's work.

(4) In any one work-room the total amount of material contained in tote boxes, being worked upon, awaiting removal o use, shall be limited in quantity to 150 lb.

Waste

(5) All waste *cellulose nitrate plastics* materials such as shavings, chips, turnings, sawdust, edgings and trimmings shall be kept under water in metal receptacles until removed from the premises.

Storage Vaults

3.2.3.6. Vaults for storing up to 7500 lb of *cellulose nitrate plastics* shall be so constructed that they shall

(a) have a minimum *fire resistance rating* of 1 1/2 hr,

(b) have a resistance to internal pressure of at least 1/2 lb/sq in.,

(c) be limited in size to 1500 cu ft,

*Superior number refers to the paragraph so numbered in the Advisory Reference Material.

(d) have explosion venting to the extent of 1 sq ft of venting area for every 30 cu ft of vault volume, and

(e) be ventilated in order to provide 0.20 sq in. of venting area for every 50 cu ft of vault volume.

Storage of large quantities

3.2.3.7. Where it is necessary to store up to 20,000 lb of *cellulose nitrate plastics* vaults shall be so constructed that they shall

(a) have a minimum *fire resistance rating* of 4 hr,

(b) have a resistance to internal pressure of 4 lb/sq in.,

(c) have explosion venting to the extent of 1 sq ft of venting area for every 50 cu ft of vault volume, and

(d) be ventilated in order to provide 0.20 sq in. of venting area for every 50 cu ft of vault volume.

Fire protection equipment

3.2.3.8.(1) All new and existing *buildings* used for the manufacture or storage of articles of *cellulose nitrate plastics* in quantities exceeding 100 lb shall be equipped with an *approved* system of automatic sprinklers providing

(a) at least one head per 20 sq ft of *floor area* and with heads equidistant from each other,

(b) pipe sizes in accordance with the requirements for extra hazard *occupancies*,

(c) sufficient water to provide 30 gal/min/sprinkler plus 500 gal/min for hose streams.

(2) Vented vaults referred to in article 3.2.3.4., sentence (3) shall contain a sprinkler system having one head to each 125 cu ft of total vault space.

Cellulose nitrate motion picture film

3.2.3.9.(1) *Cellulose nitrate motion picture film* shall not be used, stored or handled in a place of public assembly.

(2) Vented vaults referred to in article 3.2.3.4., sentence (3) shall be stored in *approved* cabinets or vaults as required by the *authority having jurisdiction.*

(3) All *cellulose nitrate motion picture film* shall be kept in *closed* individual-roll *containers* or other *approved* containers except during the actual time it is being worked upon or examined.

3.2.4. EXPLOSIVES AND AMMUNITION

General Requirements

Possession

3.2.4.1. Except as provided by the *Explosives Act* and regulations thereunder, no *person* shall have in his possession, import, store, use, make or manufacture whether wholly or in part, sell or offer for sale, any *explosive* that is not an *authorized explosive* within the corporate limits of the municipality except as provided in article 3.2.4.13.

Permits

3.2.4.2. *Permits* shall be obtained for the storage, handling or transporting of *explosives* in accordance with Section 1.4.

Discharge

3.2.4.3. No *person* shall discharge any *explosives*, except *small arms ammunition* and construction devices such as explosive rivets and explosive-driven pins or studs, for purposes other than blasting or demolition operations.

Sale

3.2.4.4. No *person* shall sell or give away any *explosive*, except *small arms ammunition* and construction devices such as explosive rivets and explosive-driven pins or studs, to any *person* not in possession of a *permit* to possess, transport, or use *explosives* as required by Section 1.4.

Sale in public thoroughfares

3.2.4.5. No *person* shall sell or expose for sale any *explosive* upon any *highway*, street, side-walk, public way, or public place within the municipality.

Storage of Explosives

General requirements

3.2.4.6.(1) All *explosives* except *small arms ammunition* shall be kept stored in a *magazine* complying with the requirements of this article provided that such *explosives* may be transported or used as permitted by this Code.

(2) A *person* to whom a *permit* has been issued to store *explosives* within the municipal limits shall be familiar with the *Explosives Act* and regulations thereunder governing the storage of *explosives*.

Magazines

(3) *Magazines* for *explosives* shall be of 3 classes: Class A, Class B and portable *magazine*.

(4) Blasting caps or detonators of any kind shall not be kept in the same *magazine* with other *explosives*.

(5) All *magazines* shall be kept locked except when being inspected or when *explosives* are being placed therein or being removed therefrom.

(6) All *magazines* shall be kept clean, dry and free of grit, paper, empty packages and rubbish.

(7) No fire or open flame of any kind shall be permitted within 25 ft of a *magazine* containing *explosives*.

(8) *Smoking* shall not be permitted in or in the vicinity of a *magazine*.

(9) *Magazines* shall not be provided with artificial heat or light, except that portable electric safety-battery lamps may be used for lighting.

(10) The area for a distance of 25 ft around a *magazine* shall be kept free of brush, grass, rubbish and other *combustible* materials.

(11) No *explosives* shall be stored within 1000 ft from any radio station, television station, radar station, water reservoir, transformer station or water-main larger than 12 in.

(12) *Magazines* shall not store materials other than *explosives* while *explosives* are contained therein.

TABLE 3.2.4.A
Forming Part of Subsection 3.2.4

Distance Requirements for Storage of Explosives†		
Quantity of explosives, lb	Distance from railway, public highway, canal or other navigable water, open place of resort where people may assemble, ft	Distance from residential, mercantile, or assembly occupancies, ft
100 or less	75	75
200	75	100
400	80	159
600	104	208
800	126	252
1000	146	292
2000	230	459
3000	296	592
4000	352	704
5000	400	800
6000	441	882
8000	509	1018
10,000	565	1129
15,000	668	1335
20,000	745	1490
30,000	863	1725
40,000	953	1906
50,000	1030	2060

†This Table is subject to modification at the discretion of the *authority having jurisdiction*.

Class A magazines

3.2.4.7.(1) Class A *magazines* shall be for the storage of *explosives* when quantities are in excess of 50 lb.

(2) Class A *magazines* shall be located at distances from neighbouring *buildings*, *highways* and railways in conformity with Table 3.2.4.A.

(3) Class A *magazines* shall be constructed of brick, concrete, iron or wood with the exterior of the walls covered with iron, or of other *approved* construction.

(4) Class A *magazines* shall be constructed to provide resistance against bullets and shall have no openings except for ventilation and entrance.

(5) Ventilation openings in Class A *magazines* shall be screened to prevent the entrance of sparks.

(6) Property upon which Class A *magazines* are located shall be posted with signs reading **EXPLOSIVES — KEEP OFF** which are located so that if any one shoots at the sign the bullet will not travel in the direction of the *magazine*.

Class B magazines

3.2.4.8.(1) Class B *magazines* shall be for the storage of *explosives* in quantities of 50 lb or less.

(2) Class B *magazines* shall be located 75 ft from neighbouring *buildings*, *highways* and railways.

(3) Class B *magazines* when within any *building* shall be located not more than 10 ft from the entrance to the floor at ground level within the *building*.

(4) Two Class B *magazines* may be located on the same premises when one is used only for storage of blasting caps in quantity not in excess of 2000 caps.

(5) The location of Class B *magazines* shall not be changed without *approval* of the *authority having jurisdiction*.

(6) Class B *magazines* shall be mounted on wheels and shall be painted bright red (vermillion) and shall be conspicuously marked **EXPLOSIVES** in white block letters not less than 3 in. in height on all sides and top.

(7) Class B *magazines* shall be constructed of 2-in. tongue-and-groove hardwood covered on the outside with No. 20 United States Standard Metal Gauge sheet iron.

Portable magazines

3.2.4.9.(1) When *explosives* in excess of immediate requirements are removed from a *magazine* and delivered in the vicinity of a blasting operation they shall be kept in a portable *magazine* consisting of either a stout tight box covered with not less than No. 24 United States Standard Metal Gauge sheet iron and equipped with a hinged lid, or in a small portable *building* similarly covered.

(2) Such portable *magazine* shall be painted bright red (vermillion) and conspicuously marked **EXPLOSIVES — DANGEROUS**, in white block letters not less than 3 in. in height.

(3) Portable *magazines* shall be located as required by the *authority having jurisdiction*.

Distance Between Magazines

3.2.4.10.(1) When 2 or more storage *magazines* are located on the same property, each *magazine* must comply with the minimum distances specified from inhabited *buildings*, railways and *highways*, and in addition they should be separated from each other by not less than the distances shown in Table 3.2.4.B, except that the quantity of *explosives* contained in cap *magazines* shall govern in regard to the spacing of the cap *magazines* from *magazines* containing other *explosives*.

(2) If any 2 or more *magazines* are separated from each other by less than the specified distances shown in Table 3.2.4.B, then such 2 or more *magazines*, as a group, must be considered as one *magazine*, and the total quantity of *explosives* stored in such group must be treated as if stored in a single *magazine* located on the site of any *magazine* of the group, and must comply with the minimum distances specified from other *magazines*, inhabited *buildings*, railways and *highways*.

TABLE 3.2.4.B
Forming Part of Subsection 3.2.4

Separation of Magazines†	
Explosive, lb	Distance when storage is barricaded, ft
2 – 5	6
5 – 10	8
10 – 20	10
20 – 30	11
30 – 40	12
40 – 50	14
50 – 75	15
75 – 100	16
100 – 125	18
125 – 150	19
150 – 200	21
200 – 250	23
250 – 300	24
300 – 400	27
400 – 500	29
500 – 600	31
600 – 700	32
700 – 800	33
800 – 900	35
900 – 1000	36

†This Table is subject to modification at the discretion of the *authority having jurisdiction.*

Transportation by Road of Explosives

Separation of detonators

3.2.4.11.(1) Blasting caps, or detonators, shall not be transported over the *highways* of the municipality on the same vehicles with other *explosives.*

Vehicles

(2) Vehicles used for the transportation of *explosives* shall be strong enough to carry the load without difficulty, and shall be in good mechanical condition.

(3) If a vehicle used for transporting *explosives* does not have a closed body, the *explosives* shall be covered with a fire resistant tarpaulin or other effective protection against moisture and sparks.

(4) Vehicles used for transporting *explosives* shall have tight floors and shall have a lining of wood or other non-sparking material which shall cover any projections or metal which might come into contact with packages of *explosives.*

(5) On any vehicle carrying *explosives* the word **EXPLOSIVES** shall be displayed in letters not less than 6 in. in height on a contrasting background so that the word **EXPLOSIVES** is plainly visible from the front and rear and from both sides of the vehicle. Signs shall not be displayed when *explosives* are not carried.

(6) Every vehicle, when used for transporting *explosives* over the *highways* of this municipality, shall be equipped with not less than 2 *approved* fire extinguishers suitable for use on *flammable liquid* fires, filled and ready for immediate use, and located near the driver's seat.

Inspection of vehicles

(7) It shall be the duty of the *person* to whom a *permit* has been issued to transport *explosives* over the *highways* of this municipality to inspect daily those vehicles employed by him to determine that

(a) fire extinguishers are filled and in working order,

(b) electric wiring is completely insulated and firmly secured,

(c) chassis, motor, body and all other parts of vehicles are clean and free from surplus oil and grease,

(d) gasoline tank and piping are secure and without leaks,

(e) brakes and steering equipment are in good condition, and

(f) the vehicle is in proper condition for handling *explosives.*

Drivers

(8) Vehicles transporting *explosives* shall only be driven by and be in charge of a careful and experienced driver who is not addicted to or under the influence of intoxicants or narcotics.

(9) Drivers of vehicles used to transport *explosives* shall be familiar with the local traffic regulations, provincial laws and the provisions of this Code and the regulations made under The *Explosives Act* governing the transportation of *explosives.*

Smoking

(10) No *person* shall smoke while on, in, or attending any vehicle containing *explosives.*

Trailers

(11) No *explosives* shall be transported in any form of pole-type trailer, nor shall any trailer be attached to a vehicle hauling *explosives.*

(12) No metal, metal tools, oils, matches, firearms, electric storage batteries, *flammable substances,* acids, *oxidizing materials* or corrosive compounds shall be carried in the bed or body of any vehicle transporting *explosives.*

(13) Vehicles containing *explosives* shall not be taken into a *garage* or other repair shop for repairs or storage.

(14) Transporting *explosives* shall be done, when possible, only during daylight hours.

(15) The driver or operator of a vehicle transporting *explosives* shall not stop unnecessarily but when a stop is necessary it shall not be longer than may be reasonably required; stops at places where the public safety would be endangered shall be avoided.

(16) Unauthorized *persons* or passengers shall not ride on a vehicle transporting *explosives.*

Deliveries

(17) A vehicle transporting *explosives* shall be left unattended only when the driver is delivering from the vehicle, at which time the vehicle will be left securely locked.

(18) When *explosives* are being delivered the *explosives* shall not be left at the place of delivery unless they are placed in a *magazine* or in charge of some competent *person* authorized to accept them.

(19) Vehicles transporting *explosives* shall not be left standing with the motor running or with the brakes unset.

Convoy distances

(20) Vehicles transporting *explosives* and travelling in the same direction shall not be driven nearer than 300 yd of each other.

Fuelling vehicles

(21) Except in emergency, the fuel tank of any vehicle shall not be filled while *explosives* are contained in such vehicle and then only when the engine is stopped.

Tunnels or subways

(22) *Explosives* shall not be transported through any completed vehicular tunnel or subway.

Loading or unloading

(23) When *explosives* are loaded or unloaded the package containing the *explosives* shall not be thrown or dropped but shall be carefully deposited and stored in such a manner as to prevent any displacement of the packages.

(24) The engine of the vehicle shall not be running during the loading or unloading of *explosives*.

Use of Explosives

3.2.4.12.(1) Blasting operations shall not be conducted between the hours of 7:00 o'clock P.M. and 7:00 o'clock A.M., nor at any time on Sundays except by special permission of the *authority having jurisdiction*.

(2) At least 24 hr in advance of blasting, the blaster shall give written notice specifying the location and intended time of blasting to appropriate representatives of the gas, electric, water, fire alarm, telephone, telegraph and steam utilities which operate within the municipality.

(3) Notice required before blasting may be waived in an emergency by the *authority having jurisdiction* and verbal instead of written notice may be given.

(4) When blasting is done in congested areas or in close proximity to a structure, railway, or *highway*, the blast shall be covered before firing with a mat constructed so that it is capable of preventing fragments from being thrown.

(5) Electric blasting caps only shall be used as the detonating agent for blasting operations in congested districts, or on *highways*, or adjacent to *highways* open to traffic.

(6) Containers of *explosives* shall not be opened inside a *magazine* or within 50 ft of a *magazine*.

(7) No metal tools other than those made from copper, bronze, brass or gun-metal shall be used for opening any container of *explosives*.

(8) No *person* shall handle *explosives* while under the influence of intoxicating liquors or narcotics.

(9) No *person* shall smoke while handling *explosives* or in the vicinity thereof.

(10) Empty boxes or cases which have previously contained *explosives* shall not be used again for any purpose, but shall be destroyed by burning in the open air.

(11) No open flame or light shall be used in the vicinity of *explosives.*

(12) Precautions shall be taken to avoid accidental discharge of electrical blasting caps by radio transmitters or other source of extraneous electricity.

(13) After each operation involving the use of *explosives* all unused *explosives* shall immediately be returned to the *magazine.*

Exceptions

3.2.4.13.(1) Nothing in this subsection shall be construed as applying to the Department of National Defence, or to the police and fire departments in the performance of their duty.

Pyrotechnics

(2) Nothing in this subsection shall be construed as applying to signal rockets or devices or compositions used to obtain visible or audible pyrotechnic effects which are covered in subsection 3.2.2.

Small arms loadings

(3) Nothing in this subsection shall be construed as prohibiting the hand-loading of *small arms ammunition* for private personal use and not for resale.

(4) Not more than 3 lb of smokeless powder and 1000 small arms primers packed in *approved* containers shall be permitted to be kept on hand when acceptable to the police authorities.

3.2.5. HAZARDOUS CHEMICALS

Scope

3.2.5.1.(1) This subsection shall apply to substances not otherwise covered in this Code which are highly flammable, or which by their presence or their close proximity to other substances creat or augment a risk of injury or damage by fire to *persons* or property. A *permit* shall be obtained in accordance with Section 1.4 for storing and handling quantities of such substances.

(2) Hazardous chemicals shall include such materials as *compressed gases, flammable substances, corrosive liquids, oxidizing material* and poisonous gases.*

Storage and handling

3.2.5.2.(1) The storage and handling of hazardous chemicals shall be controlled in such a manner that protection is assured against accidental discharge or ignition.

(2) The *authority having jurisdiction* may require the separation or isolation of any chemical that in combination with other substances may bring about a fire or explosion or may liberate a flammable or poisonous gas.

*A listing of *hazardous substances* and the hazard presented by each is contained in the Advisory Reference Material.

(3) Defective containers which permit leakage or spillage shall be disposed of or repaired in accordance with recognized safe practices;[43*] no spilled materials shall be allowed to accumulate on floors or shelves. Defective containers

(4) Where hazardous chemicals are kept for retail sale in containers or packages usual to the retail trade, storage shall be neat and orderly and shelves shall be of substantial construction. Retail sale

3.2.5.3.(1) Storage rooms for *compressed gases* shall be cool, dry and well ventilated. Compressed gases

(2) Cylinders shall be stored away from radiators and other sources of heat.

(3) No part of any cylinder containing *compressed gas* shall be subjected to temperatures above 125°F.

(4) Flammable gases such as ammonia, hydrogen, acetylene, hydrogen sulphide, etc., shall never be stored with *oxidizing materials* or with gases that support combustion such as chlorine, fluorine, nitrogen dioxide, nitrous oxide, nitrogen tetroxide, oxygen, compressed air, etc.

(5) No gas cylinder shall be stored among *combustible* materials, or in an area of acute fire hazard, where it may be subjected to the heat of fire.

(6) Each cylinder shall be labelled and marked in an *approved* manner [39*] and the construction shall be that which is satisfactory to the Chief Inspector of Pressure Vessels for the province.

(7) Where caps are provided for valve protection on cylinders they shall remain on the cylinders except for that period in which the cylinders are connected in the system utilizing the contents.

(8) Cylinders shall not be used for any purpose other than that for which they have been designed.

(9) Cylinders shall not be handled in any manner likely to cause damage to the cylinders by the failure of handling equipment (e.g., lifting magnets, rope or chain slings, etc.,). A crane may be used where the cradle or platform for lifting the cylinders is constructed to contain the cylinders securely.

3.2.5.4.(1) Flammable materials shall be stored in a cool, ventilated room away from areas of acute fire hazard and away from powerful *oxidizing materials*. Storing flammable materials

(2) Materials that are spontaneously ignitable in air shall be kept under a liquid which is inert towards the material, or under an inert atmosphere, or in sealed containers.

(3) Materials that may react with water shall be stored in *closed containers* away from sources of moisture and away from pipes which might allow moisture to drip.

*Superior number refers to the paragraph so numbered in the Advisory Reference Material.

(4) Materials that are unstable and susceptible to detonation by heat, shock, vibration or sound waves shall be stored separately and be properly safeguarded.

Storing corrosive liquids

3.2.5.5.(1) Storage rooms for corrosive liquids shall be cool and well ventilated.

(2) *Corrosive liquids* shall be kept in appropriate containers and be stored away from areas of acute fire hazard, away from powerful *oxidizing materials*, and out of direct rays of the sun.

Leakage

(3) Satisfactory provisions shall be made for containing and neutralizing or safely flushing away any leakage of *corrosive liquids* which may occur during storage or handling.

(4) Containers for *corrosive liquid* shall be kept closed and clearly identified by label.

Storing oxidizing materials

3.2.5.6.(1) Storage rooms for *oxidizing materials* shall be cool and dry.

(2) *Oxidizing materials* shall be stored away from acids and *corrosive liquids* with which they may react explosively, and away from metallic powders, organic materials and other easily *oxidizable materials*, including wooden surfaces.

Containers

(3) Containers for *oxidizing materials* shall be kept closed and clearly identified by label.

Storing poisonous gases

3.2.5.7.(1) Storage rooms for poisonous gases shall be isolated from other storage areas and shall be kept cool and well ventilated.

Cylinder storage

(2) Cylinders containing poisonous gases shall be kept away from areas of acute fire hazard and sources of heat.

(3) Poisonous gases that are flammable shall be kept away from powerful *oxidizing materials*.

Labelling of cylinders required

(4) Cylinders containing poisonous gases shall be clearly identified by label or stencil.

Warning signs required

(5) Legible warning signs stating the nature of the hazard shall be placed at all entrances to locations where poisonous gases are stored.

3.2.6. DUST EXPLOSIONS, PREVENTION OF

Dust Accumulation

Dust-tight enclosures required

3.2.6.1.(1) All dust-producing or dust-agitating machinery such as grinding mills and separators, and all elevators, elevator legs, spouts, hoppers and other conveyors shall be provided with casings or enclosures maintained as nearly dust-tight as possible.

(2) Suitable dust-collecting equipment shall be installed and accumulation of dust shall be kept at a minimum in the interior of *buildings*.

3.2.6.2.(1) Exhaust ventilation shall be provided in dust-producing areas. — Exhaust ventilation

(2) Exhaust ventilation systems shall be designed in accordance with good practice.[40]*

(3) Exhaust ventilation required in sentences (1) and (2) shall be provided with *approved* explosion relief devices or vents conforming to good practice.[41]*

Explosion Prevention

3.2.6.3.(1) *Approved* magnetic or pneumatic separators shall be installed ahead of all shellers, crackers, crushers, grinding machines, pulverizers and similar machines in which the entrance of foreign materials may cause sparks to be generated. — Separators

(2) All machinery and metal parts of the crushing, drying, pulverizing and conveying systems shall be electrically grounded. — Grounding

(3) *Smoking* and the carrying of matches, the use of heating or other devices employing an open flame, or use of any spark-producing equipment is prohibited in areas containing dust-producing or dust-agitating operations. — Sources of ignition prohibited

(4) Areas containing dust-producing or dust-agitating operations shall have artificial lighting with all wiring and electrical equipment installed in accordance with the requirements for Class II Hazardous Locations. — Lighting

3.2.7. COMBUSTIBLE FIBRES, STORAGE AND HANDLING OF

3.2.7.1. A *permit* shall be obtained for storing and handling *combustible fibre* in accordance with Section 1.4. — Permit required

Loose Storage of Combustible Fibres

3.2.7.2.(1) Loose *combustible fibres* (not in suitable bales or packages) shall not be stored within 100 ft of any *building*. — Proximity to buildings

(2) Up to 100 cu ft of loose *combustible fibres* may be kept in any *building*, provided storage is in a metal-lined bin equipped with a self-closing metal-lined cover. — Up to 100 cu ft

(3) Quantities exceeding 100 cu ft of loose *combustible fibres*, but not exceeding 500 cu ft may be stored in rooms or compartments with floors, walls, and ceilings having a *fire resistance rating* of not less than 1 hr and each *exit* or entrance equipped with an *approved* fire door. — Between 100 cu ft and 500 cu ft

(4) Quantities exceeding 500 cu ft of loose *combustible fibres*, but not exceeding 1000 cu ft may be stored in rooms or compartments with floors, walls and ceilings having a *fire resistance rating* of not less than 2 hr and each *exit* or entrance equipped with an *approved* fire door. — Exceeding 500 cu ft

*Superior number refers to the paragraph so numbered in the Advisory Reference Material.

Vaults exceeding 1000 cu ft capacity

(5) Vaults located within *buildings* and exceeding 1000 cu ft storage capacity shall be protected by *approved* automatic sprinklers, or an *approved* steam jet system.

(6) Where it is desired to store more than 1000 cu ft of loose fibres, but not more than 2500 cu ft, a detached *building* of *non-combustible* construction may be used for the storage of the fibre and for no other purpose.

Electrical installations

(7) Electrical installations shall be installed to conform to requirements for Class III, Division 2, Hazardous Locations.

Baled Storage

Storage buildings

3.2.7.3.(1) Every *building* for the storage and handling of baled *combustible fibres* shall comply with the height and area limitations of the *building bylaw* for the construction of *occupancies* having a fire load greater than 10 lb/sq ft.

(2) The maximum permissible live load on a *floor area* or part thereof shall not be exceeded.

Blocks or piles

3.2.7.4.(1) Blocks and piles of baled *combustible fibres* in storage shall be stored so that

(a) no single block or pile shall contain more than 25,000 cu ft,

(b) the maximum height of any single block or pile does not exceed 14 ft,

(c) blocks or piles are separated by aisles with a minimum width of 5 ft,

(d) clearance between blocks or piles and *building* walls is not less than 3 ft, except that if the *building* compartment is not more than 30 ft in width, a 1-ft clearance at one side wall is permissible provided that a 5-ft aisle clearance is maintained at the opposite side of the compartment immediately next to the *building* wall, and

(e) the minimum clearance between the top of any pile and the automatic sprinkler head deflectors is not less than 30 in.

3.2.8. SPRAYING AND DIPPING OF FLAMMABLE FINISHES

Definitions

3.2.8.1.(1) *Spraying area* means the area within 20 ft of *spray booths* that is not separated therefrom by partitions.

(2) *Spray booth* means a power-ventilated structure provided to enclose or accommodate a spraying operation, in order that spray vapour and residue can be controlled and properly exhausted.

(3) *Spray room* or *finishing room* means an area separated from the balance of a plant in which an entire finishing operation is housed.

(4) *Vapour area* (when referred to in this subsection) means the area within 20 ft of *dip tanks* and not separated therefrom by partitions.

Spray finishing operations

3.2.8.2.(1) Spray finishing operations shall not be conducted in other than Group F Buildings except in a room that is less than 3000 sq ft in area, separated from the other rooms by a 2-hr fire separation and protected by a sprinkler system as required in article 3.2.8.8.

(2) Spray finishing operations shall not be conducted in *cellar* or *basement* areas except by permission of the *authority having jurisdiction.*

Construction of spray booths

3.2.8.3.(1) *Spray booths* shall be of *noncombustible* construction, such as No. 18 United States Standard Metal Gauge steel on steel frame or of concrete or masonry.

(2) Interior surfaces shall be smooth and continuous.

(3) The floor of a *spray booth* and operators' working area shall be *noncombustible* non-sparking material.

(4) Baffle plates shall be of *noncombustible* material and be removable or arranged to facilitate cleaning.

(5) Exhaust ducts shall be constructed of sheet steel of a gauge satisfactory for the size of the duct in accordance with Table 3.2.8.A and be substantially supported.

TABLE 3.2.8.A
Forming Part of Sentence (5)

Size of Duct in Greatest Dimension	Thickness Sheet Steel, Gauge No.†
Up to 8 in. incl	24
Over 8 in. to 18 in. incl	22
Over 18 in. to 30 in. incl	20
Over 30 in.	18

†United States Standard Metal Gauge

(6) A clearance of 18 in. shall be maintained between ducts and unprotected *combustible* material.

(7) Where exhaust ducts pass through *combustible* roofs or partitions, metal collars with a 4- to 6-in. air space between the collars and *combustible* construction shall be provided or the space about the duct shall be sealed with suitable *noncombustible* insulating material.

(8) Each *spray booth* shall be separated from other operations by not less than 3 ft or by a construction separation suitable to the *inspector.*

(9) No open flame or spark-producing devices shall be permitted closer than 20 ft to a *spraying area* unless separated therefrom by partitions.

Ventilation of spray areas

3.2.8.4.(1) Mechanical ventilation shall be provided in all *spraying areas*, with sufficient air movement to prevent dangerous flammable vapour concentrations at all times.

(2) Ventilation shall be in use at all times when spraying operations are carried out and provisions for adequate replacement shall be made.

(3) A minimum air velocity of 100 ft/min shall be available at the face of the *spray booth* for positive exhaust of over-spray and flammable vapours.

(4) Fan blades and casings in exhaust blowers shall be non-ferrous.

(5) A separate exhaust duct shall be provided for each *spray booth* except that a common duct will be permissible if it serves no more than 3 *spray booths* with *floor area* of each not exceeding 6 sq ft, or a number of multiple cabinet *spray booths* with a combined frontal area of not more than 18 sq ft.

(6) Filters in ducts used to ventilate *spraying areas* shall be made from *noncombustible* material or have a rate of combustibility no greater than Class II filters as listed by Underwriters' Laboratories of Canada.

Electrical equipment

3.2.8.5.(1) All electrical equipment including lighting fixtures within 20 ft of the *spraying area* and not separated therefrom by partitions shall be of a type suitable for Class I, Division 1, Hazardous Locations.

(2) In *spray booths*, lighting shall be through wired glass in the side or top of the booth or from light outside the open face of the booth.

(3) Portable electric lamps, unless explosion proof, shall not be used in any *spraying area* during spraying operations.

(4) Electric motors driving exhaust fans shall not be placed inside *spray booths* or ducts.

(5) Electric motors operating within the *spraying area* shall be explosion proof.

(6) Belts shall not enter ducts or *spray booths* unless pulleys are substantially supported.

(7) All metal parts of *spray booths*, exhaust ducts and piping systems conveying *flammable liquids* shall be electrically grounded.

Storage and handling of flammable liquids

3.2.8.6.(1) *Flammable liquids* for use in *spraying areas* shall be stored and handled in accordance with subsection 2.1.6. and at no time shall the amount of *flammable liquids* including paints, lacquers, solvents and thinners in *spraying areas* exceed one day's supply.

(2) Paint shall be kept in *closed containers* when not in use.

(3) Thinners and solvents shall be stored in safety cans listed by a *recognized testing laboratory* or in *approved* containers.

(4) *Flammable liquids* shall be removed to metal cabinets, storage rooms or vaults during non-operating periods.

(5) If *flammable liquids* are supplied to spray nozzles by positive displacement pumps, the pump discharge line shall be provided with a suitable relief valve discharging to pump suction or to a safe detached location.

Maintenance for fire prevention

3.2.8.7.(1) In areas where flammable finishes are being applied by spraying or dipping, a high standard of *fire prevention* shall be maintained by

(a) preventing the accumulation of deposits and *combustible* materials,

(b) providing *approved* metal containers of a self-closing type for the daily disposal of waste,

(c) ensuring that no *cutting* or *welding* torches are used or *persons* permitted to smoke in the vicinity of *dip tanks* and drain boards,

(d) ensuring that scrapers, spuds or other tools used for cleaning are of non-sparking material,

(e) ensuring that at water-wash *spray booths* the circulating water pump shall be interlocked with the exhaust fans so that the *spray booth* cannot be used with only the fan in operation,

(f) ensuring that filter pads from dry *spray booths* are replaced as often as needed to maintain their efficiency and that used pads are disposed of promptly unless stored under water.

Sprinkler installations

3.2.8.8.(1) Automatic sprinkler protection shall be provided throughout the *spray room* on a wet pipe system and the spacing of sprinkler heads shall be such that adequate protection, satisfactory to the *authority having jurisdiction*, is provided commensurable with the amount of flammables and the construction of the *spray room*.

(2) Each *spray booth* having an area in excess of 9 sq ft shall be protected with automatic sprinklers with control provided by readily accessible outside screw and yoke valves for each booth or group of booths.

(3) Interior of ducts in *spray rooms* shall be protected with automatic sprinklers except where there is danger from freezing when open sprinklers controlled by a normally closed readily accessible valve may be used.

(4) Sprinklers in paint *spraying area* shall be protected from coating by paint deposits with a thorough application of grease or a light-weight paper bag.

Spray booths alternating as drying apparatus

3.2.8.9. *Spray booths* or other enclosures used for spraying operations shall not alternately be used for the purpose of drying by any arrangement which could cause an increase in the surface temperature of the *spray booth* room or enclosure.

Location of dip tank operations

3.2.8.10.(1) *Dip tank* operations shall not be conducted in a residential *building*, institutional *building*, or public *building* except in a room designed for this purpose, and separated vertically and horizontally from other areas by construction having not less than 2 hr fire resistance.

(2) In industrial properties *dip tanks* utilizing flammable materials shall be separated from other *occupancies* by partitions of at least 1 hr fire resistance and shall not be located in *cellars* or *basements*.

(3) Rooms containing *dip tanks* shall be protected by a system of automatic sprinklers.

(4) *Dip tank* processes shall be so located that in the event of fire, freedom of egress and access will not be impaired.

Construction of dip tanks

3.2.8.11.(1) All *dip tanks* and drain boards shall be constructed of substantial *noncombustible* material with supports of heavy metal, reinforced concrete or masonry.

(2) The top of any *dip tank* shall be at least 6 in. above the floor of the room in which it is located to prevent water flowing into the tank in the event of a fire.

(3) Liquid level of *dip tanks* shall be kept not less than 6 in. below the top of the tank.

Overflow piping

3.2.8.12.(1) *Dip tanks* having a capacity in excess of 120 gal or having a liquid surface area in excess of 10 sq ft shall be equipped with a properly trapped overflow pipe that leads to a safe location outside the *building*.

(2) The centre line of the overflow connection to a *dip tank* shall be not less than 6 in. below the top of the tank.

(3) Minimum overflow pipe sizes for *dip tanks* shall be in accordance with Table 3.2.8.B.

TABLE 3.2.8.B
Forming Part of Sentence (3)

Size of Tank, sq ft	Overflow Pipe Size Required, in.
0 – 10	2
10 – 35	2 1/2
35 – 75	3
75 – 150	4
150 – 225	5
225 – 325	6
325 and over	8

TABLE 3.2.8.C
Forming Part of Sentence (3)

Capacity of Dip Tank, gal	Diameter of Bottom Drain Pipe, in.
500 - 750	3
751 - 1000	4
1001 - 2500	5
2501 - 4000	6
4001 and over	8

Bottom drains for dip tanks

3.2.8.13.(1) *Dip tanks* over 500 gal liquid capacity shall be equipped with bottom drains automatically and manually arranged to drain the tank quickly in the event of fire.

(2) Bottom drains from *dip tanks* shall be trapped and shall discharge to a closed, properly vented salvage tank or to a safe outside location.

(3) Bottom drain sizes shall be in accordance with Table 3.2.8.C.

Ventilation where dip tanks are installed

3.2.8.14.(1) Ventilation shall be provided to confine all flammable vapour concentration exceeding 25% of the lower explosive limit to within 2 ft of the *dip tank*, drain board and freshly coated work.

(2) Ventilating systems shall be so arranged that the failure of any ventilation fan will automatically stop all dipping conveyor systems, and sound an alarm system.

Storage and handling of flammable liquids

3.2.8.15.(1) Storage and handling of *flammable liquids* shall be in accordance with subsection 2.1.6.

(2) The total number of full or empty containers for *flammable liquids* in a *dip tank* area shall not exceed the total number of full containers required for one day's operation.

Control of ignition sources in dip tank locations

3.2.8.16.(1) Open flames, spark-producing devices or heated surfaces having a temperature sufficient to ignite vapours shall not be permitted in the *vapour area.*

(2) Where liquids having a *flash point* below 110°F are contained in *dip tanks*, the electrical installation shall conform to the requirements of Class I, Division 1, Hazardous Locations and for liquids having a *flash point* above 110°F the electrical installation shall conform to Class I, Division 2, Hazardous Locations except where the liquids are heated in which case the electrical installation shall conform to Class I, Division 1, Hazardous Locations.

Fire protection

3.2.8.17.(1) Areas in the vicinity of *dip tanks* shall be provided with *portable extinguishers* of type and number in accordance with subsection 2.1.8.

(2) *Dip tanks* over 120 gal capacity or 10 sq ft liquid surface area shall be protected by an automatic closing cover actuated by an *approved* automatic device arranged for manual operation, or an automatic extinguishing system of one of the following types:

(a) water spray,

(b) foam,

(c) carbon dioxide, or

(d) dry chemical.

(3) *Dip tanks* containing a liquid with a *flash point* less than 110°F or a heated *flammable liquid* giving off flammable vapours shall conform to sentence (2) when the capacity exceeds 10 gal or the liquid surface area exceeds 4 sq ft.

Operation of quench tanks

3.2.8.18.(1) Quench tanks shall be located as far as practicable from annealing, hardening and tempering furnaces and shall not be located on or near *combustible* floors.

(2) Quench tanks shall be provided with a *noncombustible* hood and vent and shall be vented outside the *building*.

(3) A high temperature limit switch shall be provided to sound an alarm, shut off heat and stop conveyors when liquid reaches 50°F below its *flash point* in a quench tank. The temperature-sensing element shall be located close to the surface of the liquid and shall be protected from damage.

(4) Tanks over 420 gal capacity or whose liquid surface area exceeds 25 sq ft shall be protected in accordance with article 3.2.8.17., sentence (2).

(5) Air under pressure shall not be used to fill or agitate oil in tanks.

Flow-coating operations

3.2.8.19.(1) The requirements in this Code for *dip tanks* shall also apply to flow-coating operations.

(2) Positive mechanical ventilation shall be provided in the amount of 10,000 cu ft of fresh air referred to 70°F for each gallon of solvent evaporated within the flow-coater and drip tunnel.

(3) Ventilation shall be arranged so that the flammable vapour concentration exceeding 25% of the lower explosive limit will be confined to within 2 ft of the paint stream and drain area and also within 2 ft of freshly coated work and drip tunnel bottom.

(4) Ventilation shall be interlocked to shut down paint supply whenever fans are stopped.

Roll-coating processes

3.2.8.20.(1) The requirements in this Code for *dip tanks* shall also apply to roll-coating processes.

(2) All rotating parts shall be adequately grounded with static collectors installed wherever the material leaves a rotating part.

(3) Rotating parts shall operate in an atmosphere having a relative humidity between 50 and 75%.

(4) Where large quantities of materials are involved which have been freshly coated using solvents having a *flash point* less than 110°F the entire operation shall be located in an area well separated from other *occupancies* by a detachment or fire wall which is supplemented by suitable automatic protection. Freshly coated materials

3.2.8.21.(1) Electrostatic apparatus and devices used in connection with paint spray and paint detearing shall be of an *approved* type. Static control equipment

(2) Transformers, power packs, control apparatus and all other electrical portions of the equipment with the exception of high voltage grids and their connections shall be located in an area where the vapour concentration present cannot exceed 25% of the lower explosive limit.

(3) Electrostatic apparatus shall be equipped with automatic controls which will operate without time delay to disconnect power to high voltage transformers and to signal the operator when

(a) stoppage occurs involving the air supply, ventilating fan or the conveyor system,

(b) there is a ground at any point on the high voltage system, or

(c) clearances are reduced below that specified in sentence (5).

(4) All insulators shall be kept clean and dry.

(5) Between goods being deteared or painted and electrodes or conductors, a space shall be maintained equivalent to 2 times the sparking distance.

(6) A suitable sign shall be posted near an electrical assembly stating the sparking distance.

(7) Drip plates and screens subject to paint deposits shall be removable and shall be taken to a safe place for cleaning.

(8) Automatic sprinkler protection shall be provided similar to that required for paint spraying and dipping in this subsection.

3.2.9. STORAGE AND HANDLING OF RADIOACTIVE MATERIALS

3.2.9.1.(1) *Curie* means the quantity of any radioactive material giving 3.70×10^{10} disintegrations per second. Definitions

(2) *Millicurie* means one one-thousandth part of a *curie*.

(3) *Microcurie* means one one-millionth part of a *curie*.

(4) *Radioactive material* means a substance having that property of emitting ionizing radiation.

(5) *Source* (radioactive) means a substance which emits ionizing radiation, either one or all of alpha or beta particles or gamma rays.

3.2.9.2. The storage and handling of *radioactive material* shall be subject to the requirements for a *permit* contained in Section 1.4. Permit

Storage

Storage prohibited

3.2.9.3. No *radioactive material* shall be stored in any place of assembly.

Storing less than 500 millicuries

3.2.9.4.(1) *Radioactive materials* not in excess of 500 *millicuries* in any one *building* shall be stored in a *noncombustible* container of such shielding quality that the radiation reading at any surface of the container does not exceed 10 milliroentgens per hour.

(2) Containers shall be stored in a *noncombustible* cabinet or equivalent enclosure.

Storing more than 500 millicuries

3.2.9.5. *Radioactive materials* in excess of 500 *millicuries* but not exceeding 2 *curies* in any one *building* shall be stored in a fire-resistive, lead-lined safe, or equivalent enclosure so that the radiation reading at any surface of the container does not exceed 10 milliroentgens per hour.

Commercial buildings

3.2.9.6. Where *radioactive materials* are stored in a commercial *building* in amounts exceeding 2 *curies*, such *radioactive materials* shall be stored in containers of such shielding quality meeting the requirements of articles 3.2.9.3. and 3.2.9.4. and such containers shall be watertight and shall be stored in a fire-resistive vault of at least 2 hr fire resistance so constructed that the radiation reading at any exposed surface of the vault will not exceed 5 milliroentgens per hour.

Radiation Warning Symbols

3.2.9.7.(1) Radiation symbols shall be affixed or attached to all equipment, containers and structures which contain *radioactive material* licensed under the Government of Canada Atomic Energy Control Regulations.

(2) Radiation symbols shall be prominently displayed and shall be of a size that

(a) is consistent with that of the equipment or material to which they are affixed or attached, and

(b) allows the symbols to be easily recognized.

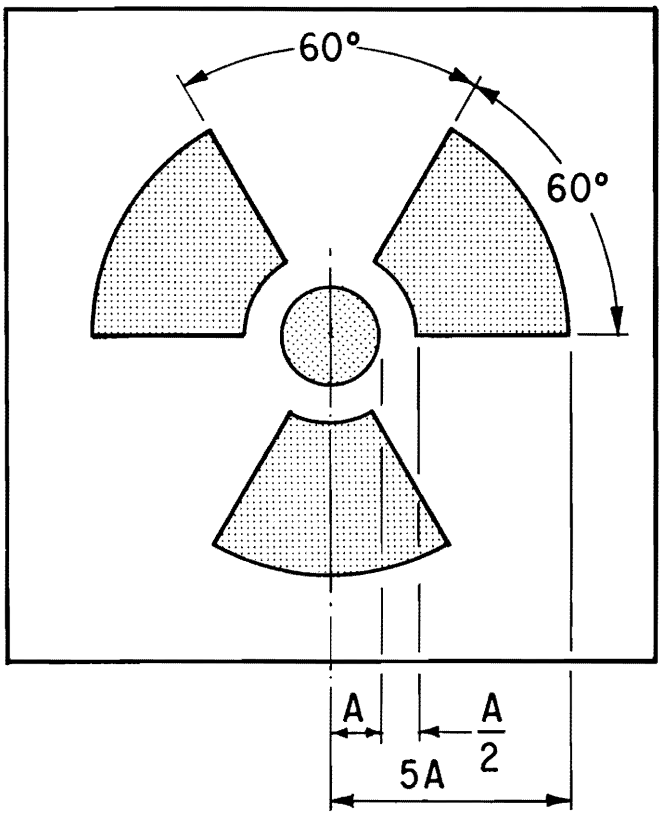
(3) A notice shall be permanently affixed near the radiation symbol to indicate the

(a) nature of the *source* of radiation,

(b) type of radiation, and

(c) limits of *occupancy* and emergency procedures to be carried out in case of fire or accident.

(4) The standard symbol for denoting the presence of radiation or *radioactive materials* shall be as illustrated in Figure 1 and coloured so that the 4 parts of the symbol, i.e., the 3 blades and the centre disc are a reddish purple (magenta) colour located against a yellow background.



A = radius of central disc
(Black construction lines do not appear in actual symbol)

Figure 1

3.2.9.8.(1) Automatic sprinklers shall be provided where *combustible* or flammable material is present in a room containing *radioactive materials*. Fire protection

(2) Sprinkler protection may be omitted only if the *building* construction and *building* contents are *noncombustible*.

(3) Specially engineered extinguishing systems of water spray, carbon dioxide, foam or dry powder, as may be appropriate, shall be provided to protect special hazard processes or *occupancies*.

3.2.10. FUMIGATION AND THERMAL INSECTICIDAL FOGGING

3.2.10.1. No fumigation process shall be carried out that does not satisfy the requirements for a *permit* and *licence* contained in Section 1.4. Permit required

Notification required

3.2.10.2.(1) The Fire Department shall be notified in writing at least 24 hr before any *building* or structure is to be closed in connection with the use of any toxic or flammable *fumigant.*

(2) Notification shall be delivered to the occupants of any neighbouring property adjacent to that in which fumigation or *thermal insecticidal fogging* is to take place.

Preparation of structure

3.2.10.3.(1) All fires, open flames and similar sources of ignition shall be eliminated from the space under fumigation or *thermal insecticidal fogging.*

(2) Electric power supply to the *building* or enclosed space being fumigated shall also be cut off to prevent any ignition hazard from light bulbs, sparking of electric switches, motors or other electrical equipment.

(3) Heating, if needed, shall be by steam or hot water and the temperatures in the area shall not be such that they will activate sprinkler systems where such systems exist.

(4) The licensee shall satisfy the *authority having jurisdiction* and the occupants of any contiguous premises that suitable precautions have been taken to prevent the leakage of any toxic or flammable *fumigant* into such premises.

Use of certain agents restricted

3.2.10.4.(1) The use of hydrogen cyanide or of any substance or combination of substances liberating hydrogen cyanide shall be prohibited for the purpose of fumigation.

(2) No *thermal insecticidal fogging* liquid shall be used that has a *flash point* below 120°F.

Breathing apparatus required

3.2.10.5. All licensees shall maintain and have available *approved* protective breathing apparatus.

Watchman required during fumigation

3.2.10.6.(1) During the period fumigation is in process, except when fumigation is conducted in a gas-tight vault or tank, a capable, alert watchman or watchmen shall remain on duty at the entrance or entrances to the *building* or enclosed space fumigated until after the fumigation is completed and until the premises are properly ventilated and again safe for human *occupancy.*

(2) Sufficient watchmen shall be provided to prevent any *person* from entering the *building* or enclosed space under fumigation without being observed.

Re-entry

3.2.10.7. No unauthorized *person* shall be allowed into the premises until the latter have been thoroughly ventilated and declared safe for human *occupancy* by the *authority having jurisdiction.*

Warning signs

3.2.10.8. Suitable warning signs shall be posted in a conspicuous location near the entrance or entrances to the *building*, or part thereof, being fumigated.

3.2.10.9. In any structure being fumigated the *fire protection equipment* shall be kept in service and *portable extinguishers* and fire hose shall be readily available in the event of an emergency. Fire protection equipment

3.2.11. WELDING AND CUTTING

3.2.11.1.(1) A *permit* shall be obtained for *welding* and *cutting* operations in accordance with Section 1.4. Permit

(2) The installation and operation of all gas *welding* and *cutting* equipment shall be in accordance with recommended safe practice.[42]*

(3) Only *approved* equipment that has been tested and found to be safeguarded as far as practicable shall be used for *welding* and *cutting*.

(4) All cylinders or containers used for the storage of *compressed gases* shall be constructed, tested, charged and marked in accordance with nationally recognized safe practices.[43]*

3.2.11.2.(1) The storage of cylinders of fuel gases in *buildings* in excess of immediate requirements (those in actual use or attached and ready for use) shall be limited to 2000 cu ft of gas. Storing cylinders

(2) Cylinders stored inside *buildings* shall be located in an area clear of highly *combustible* material where they will not be subject to excessive temperature rise, mechanical injury or tampering.

(3) All cylinders including empty ones shall have their caps in place and all valves tightly closed.

3.2.11.3.(1) Prior to the start of any *welding* or *cutting* operation, inspection of the work location shall be made by a *person* in authority in company with the welder to ensure that all necessary precautions have been taken to protect adjacent *combustibles*, taking into consideration their ease of ignition, rate of burning and heat transference. Inspection of work area

(2) The *owner* or his representative shall detail *welding* and *cutting* requirements and ensure that fire watchmen are employed.

(3) Immediately following the cessation of any *welding* and *cutting* operation, the work area shall be scrupulously inspected for fire safety by a *person* in authority.

(4) Where *welding* and *cutting* operations have taken place in an area requiring protection for *combustibles* the area shall be kept under observation for a period of not less than 30 min after the inspection required by sentence (3) has taken place.

(5) Where practicable, *combustible* floors shall be wet down before starting the work and upon completion of the work.

*Superior number refers to the paragraph so numbered in the Advisory Reference Material.

Safety requirements

3.2.11.4.(1) Operators shall take all reasonable precautions against damage to torches, regulators, hoses and other oxy-acetylene *welding* and *cutting* equipment.

(2) Operators shall test *welding* and *cutting* equipment for leaks with a soap solution and closely examine all equipment daily for any defects.

(3) All *combustible* materials shall be removed 40 ft from the *welding* and *cutting* area.

(4) Special precautions as outlined in article 3.2.11.3. shall be taken when *welding* or *cutting* near or in vertical openings, i.e., service flues, vent shafts, duct work, etc.

(5) Immovable *combustible* material shall be protected by sheet metal, asbestos blankets, or other suitable guards fitted closely enough together to prevent escape of sparks, flame, molten slag or hot metal.

(6) When *welding* or *cutting* is to be carried out near piping containing flammable gas, the section of the piping located within a 3-ft radius of the torch shall be covered with wet asbestos to a minimum thickness of 1/4 in. and the *welding* or *cutting* operation shall be carried out only under the supervision of a *person* in authority.

(7) The operator shall ensure at all times that the oxygen pressure is not so excessive that extra sparks are produced and slag flow is increased.

(8) All valves shall be closed when equipment is not in actual use.

(9) No oil or grease shall be used for lubrication of *welding* or *cutting* equipment.

(10) One or more portable extinguishers of suitable type shall be immediately at hand during *welding* and *cutting* operations.

(11) Existing water sprinkler or other fixed fire protection systems will be maintained in service unless such systems are directly involved in the *cutting* or *welding* operation.

Welding and cutting of containers used for combustible storage

3.2.11.5.(1) *Welding* or *cutting* of metal containers that have held *combustibles* shall not be undertaken without a *permit* from the *authority having jurisdiction.*

(2) In every case, it shall be established that no *flammable*, *explosive*, or toxic vapours or *substances* are present in the container to be welded.

(3) Prior to the start of any *welding* or *cutting* operation, all containers shall be cleaned and proven safe by *approved* gas sample test and shall be tagged, dated and signed by a competent *person* acceptable to the *authority having jurisdiction.*

(4) The container shall be disconnected and removed from the vicinity of all sources of ignition.

(5) The container, including all internal piping, traps and standpipes shall be thoroughly drained and emptied and any sludge or scale shall be completely removed with non-sparking tools.

(6) All compartments in a container having 2 or more compartments shall be treated in the same manner regardless of which compartment is to be welded or cut.

(7) Precautions against fire and explosion in containers that are to be cleaned by general water treatment, hot chemical solution, inert gas or steam method, shall be in accordance with good practice.[44]*

(8) When possible a *flammable liquid* container involved in *welding* or *cutting* operations shall be partly filled with water to reduce the internal volume available for the retention of flammable vapours.

Acetylene generating systems

3.2.11.6.(1) No *person* without a *permit* shall operate an acetylene generator having a calcium carbide capacity exceeding 5 lb.

(2) Facilities for the generation and storage of welding fuel gases shall be located only in *buildings* that are a distance of 50 ft or more from *occupancies* classed as assembly, institutional, residential or mercantile.

(3) Acetylene generators shall be of *approved* type and shall be plainly marked with the rate in cu ft of acetylene/hr for which they are designed, the amount or weight of carbide necessary for a single charge, the manufacturer's name and address, and the name or number of the type of generator.

(4) Stationary generators shall be installed preferably in a well ventilated, one-storey, outside generator house, or in a room or compartment of a *building* provided they are installed on the top floor of the *building* and that the room or compartment is well ventilated, of ample size and of a construction complying with sentence (6).

(5) The storage of fuel gas cylinders in rooms or compartments described in sentence (4) shall not exceed a total capacity of 2000 cu ft of gas measured at normal temperature and pressure.

(6) The walls, floor and ceiling of rooms or compartments containing stationary generators shall be of construction having a *fire resistance rating* of not less than 1 hr.

(7) At least one wall of a room or compartment containing stationary generators shall be an exterior wall. A portion of this wall equal to not less than 10% of the combined areas of the enclosing walls shall be of light *noncombustible* material such as single thickness, single strength glass. Single thickness, single strength window glass skylights, lightly fastened roof hatch covers, swinging doors in exterior wall opening outward, sheet metal siding or light fastened roofs may be accepted in part or

*Superior number refers to the paragraph so numbered in the Advisory Reference Material.

entirely in lieu of the glass area or its equivalent if the required percentage of explosion venting area is thus obtained.

(8) Portable generators shall not be used in rooms of total volume less than 35 times the total gas generating capacity per charge of all generators in the room assuming a gas generating capacity of 4 1/2 cu ft/lb of carbide.

(9) Generators shall not be used in rooms having ceiling height less than 10 ft.

(10) No acetylene generator when charged shall be moved by derrick, crane or hoist.

(11) Generators shall be placed where water will not freeze.

(12) No common salt (sodium chloride) or other corrosive chemical shall be used as a protection against freezing.

Storage of calcium carbide

3.2.11.7.(1) No *person* without a *permit* shall store or keep calcium carbide in excess of 200 lb.

(2) Containers used for the storage of calcium carbide shall be of metal of sufficient strength to ensure handling without rupture, and shall be provided with a screw top or its equivalent.

(3) Containers shall be of watertight and air-tight construction.

(4) Solder shall not be used on joints of containers in such manner that fire would disrupt the package.

(5) Packages shall be marked **CALCIUM CARBIDE — DANGEROUS IF NOT KEPT DRY.**

(6) Storage of calcium carbide inside *buildings* shall be in a dry, waterproof and well ventilated location.

(7) Calcium carbide in excess of 600 lb shall not be stored in a *building* containing any other *occupancy* unless in an acetylene generator room whose construction complies with the *building bylaw* [45]* for storing hazardous substances, or in a separate room or compartment of a one-storey *building* with no *cellar* or *basement* underneath the carbide storage section.

(8) Calcium carbide in excess of 5000 lb shall be stored in one-storey *buildings* without *cellar* or *basement* and used for no other purpose except the storage of fuel gas cylinders or in outside acetylene generator houses.

*Superior number refers to the paragraph so numbered in the Advisory Reference Material.

Read a first time_____**19**___

Read a second time_____**19**___

Read a third time and passed this_____**day of**

_____**19**___

_____

Mayor

_____

Clerk

ADVISORY REFERENCE MATERIAL

TABLE OF CONTENTS

STATEMENTS REGARDING PROVINCIAL ENABLING LEGISLATION

Municipalities desirous of making use of the National Fire Code of Canada, 1963, as the whole or a part of their fire prevention bylaw are requested to

(a) notify the office of the provincial fire marshal or commissioner of their intent to use the National Fire Code, and

(b) make direct reference to the appropriate provincial or territorial laws prior to passing any such bylaw.

PROVINCIAL ENABLING LEGISLATION

ALBERTA	City Act, Section 276, Para "n". Towns and Villages Act, Section 303, Para "o".
BRITISH COLUMBIA	Municipal Act, R.S.B.C., 1960, Chapter 255, Part XIX and Section 642. Vancouver Charter, Chapter 55.
MANITOBA	Municipal Act, R.S.M., 1954, Chapter 173.
NEW BRUNSWICK	The Town's Act, R.S.N.B., 1952, Chapter 234. The Village's Act, R.S.N.B., 1952, Chapter 242. The Local Improvement Districts Act, R.S.N.B., Chapter 136.
NEWFOUNDLAND	Act Respecting the Prevention of Fire. Local Government Act. The City of St. John's Act. City of Corner Brook Act.
NOVA SCOTIA	Towns Incorporation Act, R.S.N.S., Chapter 293, Section 243. Municipal Act, R.S.N.S., 1955, Chapter 7, Section 189.
ONTARIO	The Planning Act, R.S.O., 1960, Chapter 296, as amended by Subsection (3) of Section 7, Chapter 104, The Statutes of Ontario 1961-62.
PRINCE EDWARD ISLAND	Fire Prevention Act.
QUEBEC	Municipal Code. Cities and Towns Law.
SASKATCHEWAN	Fire Prevention Act, R.S.S., 1954, as amended.
NORTHWEST TERRITORY	Revised Ordinance of the Northwest Territories (1956), Chapter 73, Section 155.
YUKON TERRITORY	Revised Ordinances of the Yukon Territory, Chapter 79, Section 151.

REFERENCES TO RECOGNIZED TECHNICAL STANDARDS AND CODES

Paragraphs numbered to correspond with the superior numbers found throughout the Code are contained herein to assist in the interpretation of the requirements of the National Fire Code of Canada, 1963.

The technical standards and codes referred to in succeeding numbered paragraphs have been issued by the following organizations:

Canadian Government Specifications Board, (CGSB)
National Research Council,
Ottawa 2, Canada.

Canadian Standards Association, (CSA)
235 Montreal Road,
Ottawa 7, Canada.

Board of Transport Commissioners for Canada,
Union Station,
Ottawa, Canada.

Associate Committee on the National Building Code,
National Research Council,
Ottawa 2, Canada.

Underwriters' Laboratories of Canada,
7 Crouse Road,
Scarborough, Ontario, Canada.

American Society for Testing and Materials, (ASTM)
1916 Race Street,
Philadelphia 3, Pa., U.S.A.

American Standards Association, (ASA)
10 East 40th Street,
New York 16, N.Y., U.S.A.

American Society of Mechanical Engineers, (ASME)
345 East Forty-seventh Street,
New York 17, N.Y., U.S.A.

National Fire Protection Association, International, (NFPA)
60 Batterymarch Street,
Boston 10, Mass., U.S.A.

American Petroleum Institute, (API)
1271 Avenue of the Americas,
New York 20, N.Y., U.S.A.

Factory Mutual Engineering Division,
1151 Boston-Providence Turnpike,
Norwood, Mass., U.S.A.

Note: The abbreviations included with the title of the above organizations are used in the reference paragraphs instead of the full title. The abbreviation identifies the organization which issues the document referred to.

REFERENCE PARAGRAPHS CORRESPONDING TO SUPERIOR NUMBERS

Where it is appropriate that proper standards and codes are brought to the attention of the user to be of assistance if the requirement in this Code is not relevant to existing municipal or provincial regulations, or where it is desirable to provide an indication of what is considered to be "good practice", the following paragraphs apply.

1. In the absence of a building bylaw, the design and construction of the whole or any part of a building or alteration to a building should be in accordance with the provisions of the National Building Code of Canada, 1960.

2. In the absence of provincial regulations, the storage and handling of liquefied petroleum gases should be in accordance with CSA B-149 (1962), Installation Code for Gas Burning Appliances and Equipment.

3. The flash point should be determined in accordance with ASTM D-56 (1961), Method of Test for Flash Point by Tag Closed Tester.

4. The flash point should be determined in accordance with ASTM D-93 (1961), Method of Test for Flash Point by Pensky-Martens Closed Tester, or if the flash point is 70°F or less, sections 7 and 8 of ASTM D-56 (1961) shall be used.

5. In the absence of a building bylaw or construction requirements in the building bylaw concerning buildings used for the storage and dispensing of flammable liquids, reference should be made to the requirements for Group F buildings in the National Building Code of Canada, 1960.

6. In the absence of a building bylaw or requirements in the building bylaw concerning fire separations between buildings housing flammable liquids, reference should be made to subsection 3.2.2. of the National Building Code of Canada, 1960.

7. "Good practice" for tanks manufactured to contain flammable liquids should be such that

(a) fabrication conforms to minimum requirements such as those of the Underwriters' Laboratories of Canada,

(b) plate steel conforms to such specifications as CSA G40.5-1959, Grade C,

(c) sheet steel conforms to such specifications as ASTM A245-61T, Grade C,

(d) structural shapes and reinforcing members conform to such specifications as CSA G40.4-1959, and

(e) joints are welded or riveted and caulked or made tight by other approved processes.

8. Conformance with General Order No. 823 of the Board of Transport Commissioners is considered good practice.

9. Conformance with API Standard 12A-1951, Specification for Oil Storage Tanks with Riveted Shells; or API Standard 650-1961, Specification for Welded Oil Storage Tanks, is considered good practice.

10. Conformance with API Standard 620-1963, Recommended Rules for the Design and Construction of Large, Welded, Low-Pressure Storage Tanks, is considered good practice.

11. Conformance with API Standard 12B-1958, Specification for Bolted Production Tanks; API Standard 12D-1957, Specification for Large Welded Production Tanks; or API Standard 12F-1961, Specification for Small Welded Production Tanks, is considered good practice.

12. Conformance with ASA B36.10-1959, Wrought Steel and Wrought Iron Pipe, is considered good practice.

13. Conformance with ASA B31.1-1955 and Addenda 21.1a-1961, Code for Pressure Piping, is considered good practice.

14. Conformance with ASA B31.1-1955 and Addenda 21.1a-1961, Code for Pressure Piping, is considered good practice.

15. Conformance with ASTM B251-61, Specification for General Requirements for Wrought, Seamless, Copper, Copper-Alloy Pipe and Tube, is considered good practice.

16. The colour "yellow" should be in accordance with Code No. 5-2 of Standard 1-GP-12b, Schedule of Paint Colours, as published by the Canadian Government Specifications Board.

17. Conformance with ASA Standard B2.1-1960, Pipe Threads, is considered good practice.

18. Conformance with ASA B31.1-1955 and Addenda 31.1a-1961, Code for Pressure Piping, is considered good practice.

19. Conformance with API Standard 1104-1961, Field Welding of Pipe Lines, is considered good practice.

20. Conformance with ASA Standard B16.5-1961, Steel Pipe Flanges and Flanged Fittings, is considered good practice.

21. Conformance with ASA Standard B16.5-1961, Steel Pipe Flanges and Flanged Fittings, is considered good practice.

22. Conformance with ASTM A193-61T Grade B-7, Specification for Alloy-Steel Bolting Materials for High-Temperature Services, is considered good practice.

23. In the absence of provincial regulations, tanks for hydraulic transfer systems should be constructed, installed and tested in accordance with ASME Boiler and Pressure Vessel Code, Section VIII, Unfired Pressure Vessels, 1962.

24. In the absence of provincial regulations, inert gas transfer systems should be constructed, installed and tested in accordance with ASME Boiler and Pressure Vessel Code, Section VIII, Unfired Pressure Vessels, 1962.

25. In the absence of a building bylaw or installation requirements for solid-fuel fired equipment in the building bylaw, the requirements of Part 6 of the National Building Code of Canada, 1960, should be followed.

26. In the absence of provincial regulations for the installation of heating appliances, the following standards should be used:

(a) oil firing – CSA B139-1957, Installation Code for Oil Burning Equipment, and

(b) gas firing – CSA B149-1962, Installation Code for Gas Burning Appliances and Equipment.

27. "Proper maintenance" of portable extinguishers is described in NFPA 10-1962, Standard for the Installation, Maintenance and Use of Portable Fire Extinguishers.

28. Tests for determining the effectiveness of flameproof textiles and methods for flameproofing are contained in NFPA No. 701-1951, Flameproofed Textiles.

29. In the absence of a building bylaw or requirements in the building bylaw concerning fire spread between and inside buildings, reference should be made to Part 3 of the National Building Code of Canada, 1960.

30. In the absence of a building bylaw or requirements in the building bylaw regulating exits from floor areas, reference should be made to subsection 3.4.2. of the National Building Code of Canada, 1960.

31. Conformance with NFPA 14-1952, Standpipe and Hose Systems, is considered good practice.

32. Conformance with NFPA 91-1961, Blower and Exhaust Systems, is considered good practice.

33. Conformance with NFPA 13-1961, Installation of Sprinkler Systems, is considered good practice.

Notes: 1. It is recommended that sprinkler systems be provided with control station supervisory service where available, or be connected into the municipal fire alarm system.

2. In piers having sprinklered substructures, it is strongly recommended that the sprinkler system be extended up into the superstructures even though the latter may be of small size.

34. Conformance with NFPA 72-1962, Proprietary, Auxiliary and Local Protective Signalling Systems, and NFPA 72C-1962, Remote Station Protective Signalling Systems, is considered good practice.

35. In the absence of a building bylaw or requirements in the building bylaw concerning occupancy and fire protection in plastics manufacturing buildings, reference should be made to Part 3 of the National Building Code of Canada, 1960.

36. In the absence of a building bylaw or of construction requirements in the building bylaw concerning the use and occupancy of garages, reference should be made to Part 3 of the National Building Code of Canada, 1960.

37. Cabinets or vaults as recommended by the Factory Mutual Engineering Division, or as described in NFPA 42-1962, Pyroxylin Plastics in Factories, and NFPA 43-1962, Pyroxylin Plastic Storage and Sale, are recognized as acceptable methods of storing cellulose nitrate plastics.

38. Containers for film having a cellulose nitrate base that conform to the requirements of the Board of Transport Commissioners exemplify containers suitable for approval.

39. Cylinders marked in accordance with the requirements of the Board of Transport Commissioners or the Interstate Commerce Commission of the United States exemplify cylinders marked in a manner suitable for approval.

40. Conformance with Part 6 of the National Building Code of Canada, 1960, is considered good practice.

41. Conformance with NFPA 68-1954, Explosion Venting, is considered good practice.

42. Conformance with CSA Standard W117-1952, Code for Safety in Electric and Gas Welding and Cutting Operations, is considered safe practice.

43. Conformance with regulations of the Board of Transport Commissioners for Canada, or the Interstate Commerce Commission of the United States, is considered safe practice.

44. Conformance with CSA Standard W117-1952, Code for Safety in Electric and Gas Welding and Cutting Operations, and also CSA Standard W47-1947, Welding Qualification Code for the Application to Fabricating and Contracting Firms, is considered good practice.

45. In the absence of a building bylaw or requirements in the building bylaw concerning the storage of hazardous substances, reference should be made to the requirements for Group F, Division 1, Occupancies, of the National Building Code of Canada, 1960.

46. In the absence of a building bylaw or requirements for fire resistance ratings in the building bylaw, fire resistance ratings should be assigned for any element or assembly of materials which

(a) have been tested in accordance with:

(i) Standard Methods of Fire Tests of Building Construction and Materials (ASTM E119-58) of the American Society for Testing and Materials,

(ii) Standard Methods of Fire Tests of Door Assemblies (ASTM E152-58) of the American Society for Testing and Materials,

(iii) Fire Tests on Building Materials and Structures, B.S. 476 Part I, 1953, of the British Standards Institution, or

(b) is contained in the list of fire resistance ratings published by the National Research Council as a supplementary document to the National Building Code of Canada, 1960.

47. Building construction materials which have been classified as noncombustible in accordance with the procedures prescribed in the National Building Code of Canada, 1960, should be considered noncombustible.

REFERENCE TABLES

TABLE A-1

FLAMMABILITY HAZARD OF PLASTICS

Plastics Group	Type (See Note 1)	Burning Rate (See Note 2)	Flammability Groups A–D (See Note 3)	Toxic Gases Likely to be Produced (in addition to the primary products of combustion)
Acetal	TP	Slow	C	
Acrylics				
Methyl Methacrylate –cast resin and moulding compound	TP	Slow	C	
Modified Acrylic –moulding compound	TP	Slow	C	
Polyacrylic Ester –moulding material (filled and vulcanized)	TS	Fast	D	
Allyls				
Allyl – cast resin	TS	Slow	C	
Diallyl Phthalate –moulding compound:				
–no filler	TS	Slow	C	
–glass filled	TS	SE	A	
–mineral filled	TS	SE	A	
–synthetic fibre filled	TS	Slow to SE	A to C	
Casein				
–moulding compound	TS	Very low	B	
Cellulosic Plastics				
Ethyl Cellulose –moulding compound and sheet	TP	Slow	C	
Cellulose Acetate –moulding compound and sheet	TP	Slow to SE	A to C	
Cellulose Acetate–High Acetyl	TP	Slow to SE	A to C	
Cellulose Acetate Butyrate –moulding compound and sheet	TP	Slow	C	
Cellulose Nitrate (Pyroxylin)	TP	Very fast	D	
Cellulose Propionate –moulding compound	TP	Slow	C	
Chlorinated Polyether	TP	SE	A	Hydrochloric Acid

Notes: (1) TP – Thermoplastic
TS – Thermosetting

(2) SE – Self-extinguishing

(3) Groups A, B, C and D are defined in article 2.3.6.1., sentence (1)

TABLE A-1
FLAMMABILITY HAZARD OF PLASTICS (continued)

Plastics Group	Type (See Note 1)	Burning Rate (See Note 2)	Flammability Groups A–D (See Note 3)	Toxic Gases Likely to be Produced (in addition to the primary products of combustion)
Cold Moulded Plastics				
–moulding compound:				
–non-refractory (organic)	TS	Nil	A	
–refractory (inorganic)	TS	Nil	A	
Epoxides				
–cast resins:				
–no filler	TS	Slow	C	
–silica filled	TS	SE	A	
–flexibilized	TS	Slow	C	
e.g., Polysulphide Epoxy				Hydrochloric Acid
–moulding compound:				
–no filler	TS	Medium to SE	C	
–mineral filled	TS	Medium to SE	C	
Fluoroplastics				
Polytrifluorochloroethylene	TP	Nil	A	Hydrofluoric and Hydrochloric Acids
Polytetrafluoroethylene	TP	Nil	A	Hydrofluoric Acid
FEP Fluorocarbons	TP	Nil	A	
Furane				
–moulding compound	TS	Slow	C	
Glyceryl Phthalate				
–cast resin	TS	Slow	C	
Inorganic Moulded Plastics				
Glass-bonded Mica				
–compression moulded	TP	Nil	A	
–injection moulded	TP	Nil	A	
Melamine-Formaldehyde				
–moulding compound:				
–no filler	TS	SE	A	
–alpha-cellulose filled	TS	Nil	A	Ammonia, Phenols, Hydrocyanic Acid, Hydrochloric Acid
–cellulose filled	TS	Nil	A	
–flock filled	TS	Nil	A	
–asbestos filled	TS	Nil	A	
–macerated fabric filled	TS	Nil	A	
–macerated fabric filled (Phenolic modified)	TS	Very low	B	
–glass-fibre filled	TS	Nil	A	

Notes: (1) TP – Thermoplastic
TS – Thermosetting
(2) SE – Self-extinguishing
(3) Groups A, B, C and D are defined in article 2.3.6.1., sentence (1)

TABLE A-1

FLAMMABILITY HAZARD OF PLASTICS (continued)

Plastics Group	Type (See Note 1)	Burning Rate (See Note 2)	Flammability Groups A–D (See Note 3)	Toxic Gases Likely to be Produced (in addition to the primary products of combustion)
Nylons				
–moulding compound:				
Type 6 injection moulding and extrusion	TP	SE	A	Ammonia
Type 6/6 injection moulding and extrusion	TP	SE	A	Ammonia
30% glass-fibre filled	TP	Slow to SE	A to C	Ammonia
Phenolics				
Phenol-Formaldehyde				
–moulding compound:				
–no filler	TS	Very low	B	Phenols
–wood-flour and cotton-flock filled	TS	Very low	B	Phenols
–asbestos filled	TS	Nil	A	Phenols
–mica filled	TS	Nil	A	Phenols
–glass-fibre filled	TS	Nil	A	Phenols
–macerated fabric and cord filled	TS	Very low	B	Phenols
–preformed pulp and moulding board	TS	Very low to SE	A to B	
–cast resin:				
–general purpose				
–no filler	TS	Very low	B	Phenols
–mineral filled	TS	Almost nil	B	Phenols
–asbestos filled	TS	Almost nil	B	Phenols
–mechanical grade	TS	Very low	B	
–compounded with Butadiene-Acrylonitrile copolymer				
–wood-flour and cotton-flock filled	TS	Slow	C	Phenols, Hydrocyanic Acid
–asbestos filler	TS	Very low	B	Phenols, Hydrocyanic Acid
–rag filled	TS	Slow	C	Phenols, Hydrocyanic Acid

Notes: (1) TP – Thermoplastic
TS – Thermosetting
(2) SE – Self-extinguishing
(3) Groups A, B, C and D are defined in article 2.3.6.1., sentence (1)

TABLE A-1

FLAMMABILITY HAZARDS OF PLASTICS (continued)

Plastics Group	Type (See Note 1)	Burning Rate (See Note 2)	Flammability Groups A–D (See Note 3)	Toxic Gases Likely to be Produced (in addition to the primary products of combustion)
Phenolics—continued				
Phenol-Furfural				
–moulding compound:				
–no filler	TS	Very low	B	Phenols
–wood-flour and cotton-flock filled	TS	Very low	B	
–asbestos filled	TS	Nil	A	
–mica filled	TS	Nil	A	
–glass-fibre filled	TS	Nil	A	
–macerated fabric and cord filled	TS	Very low	B	
–preformed pulp and moulding board	TS	Very low to SE	A to B	
–cast resin:				
–general purpose				
–no filler	TS	Very low	B	Phenols
–mineral filled	TS	Almost nil	B	
–asbestos filled	TS	Almost nil	B	
–mechanical grade	TS	Very low	B	
–compounded with Butadiene-Acrylonitrile copolymer				
–wood-flour and cotton-flour filled	TS	Slow	C	Phenols, Hydrocyanic Acid
–asbestos filler	TS	Very low	B	
–rag filled	TS	Slow	C	
Polycarbonates	TP	SE	A	Hydrochloric Acid

Notes: (1) TP – Thermoplastic
TS – Thermosetting
(2) SE – Self-extinguishing
(3) Groups A, B, C and D are defined in article 2.3.6.1., sentence (1)

TABLE A-1

FLAMMABILITY HAZARD OF PLASTICS (continued)

Plastics Group	Type (See Note 1)	Burning Rate (See Note 2)	Flammability Groups A–D (See Note 3)	Toxic Gases Likely to be Produced (in addition to the primary products of combustion)
Polyesters				
–moulding material:				
–glass-fibre filled	TS	Slow to SE	A to C	
–mineral filled (granular and putty)	TS	Slow to SE	A to C	
–asbestos filled	TS	SE	A	
–synthetic fibre filled	TS	SE	A	
–cast resin (rigid):				
–no filler	TS	Slow to SE	A to C	
–glass filled	TS	Slow to SE	A to C	
–mineral filled	TS	Slot to SE	A to C	
–cast resin (flexible)	TS	Slow	C	
Polyolefins				
Polyethylene				
–high density	TP	Very low	B	
–medium density	TP	Very low	B	
–low density	TP	Very low	B	
Polypropylene	TP	Slow	C	
Polystyrenes				
Polystyrene				
–moulding compound and sheet:				
–general purpose				
–no filler	TP	Slow	C	
–30-35% glass-fibre filled	TP	Slow	C	
–mechanical grade				
–heat and chemical resistant type	TP	Slow	C	
–shock resistant type	TP	Slow	C	
Styrene Blends:				
Acrylonitrile-Styrene copolymer	TP	Slow	C	Hydrocyanic Acid
Acrylonitrile-Butadiene-Styrene copolymer	TP	Slow	C	Hydrocyanic Acid
Polyurethanes				
–moulding compound	TP & TS	SE	A	Hydrocyanic Acid

Notes: (1) TP – Thermoplastic
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(2) SE – Self-extinguishing
(3) Groups A, B, C and D are defined in article 2.3.6.1., sentence (1)

TABLE A-1

FLAMMABILITY HAZARD OF PLASTICS (concluded)

Plastics Group	Type (See Note 1)	Burning Rate (See Note 2)	Flammability Groups A–D (See Note 3)	Toxic Gases Likely to be Produced (in addition to the primary products of combustion)
Rubber				
–moulding compound:				
–chlorinated rubber	TP	Nil	A	Chlorine
–hard rubber				
–no filler	TP	Medium	C	
–mineral filled	TP	Medium	C	
Silicones				
–moulding compound:				
–asbestos filled	TS	Slow to Nil	A to C	
–glass-fibre filled	TS	Slow to Nil	A to C	
Urea-Formaldehyde				
–moulding compound:				
–alpha-cellulose filled	TS	Very low	B	Ammonia, Phenols
–cellulose filled	TS	Very low	B	
Vinyls				
Polyvinyl Acetal				
–moulding compound	TP	Slow	C	
Polyvinyl Acetate				
–moulding compound	TP	Slow	C	
Polyvinyl Alcohol				
–moulding compound	TP	Slow	C	
Polyvinyl Butyral				
–moulding compound:				
–rigid	TP	Slow	C	
–flexible				
–no filler	TP	Slow	C	
–filled	TP	Slow	C	
Polyvinyl Chloride				
–moulding compound and sheet:				
–rigid	TP	SE	A	Chlorine
–flexible				
–no filler	TP	Slow to SE	A to C	Hydrochloric Acid
–filled	TP	Slow to SE	A to C	
Polyvinyl Chloride-Acetate				
–moulding compound and sheet:				
–rigid	TP	SE	A	
–flexible				
–no filler	TP	Slow to SE	A to C	
–filled	TP	Slow to SE	A to C	
Polyvinyl Formal				
–moulding compound	TP	Slow	C	Phenols
Polyvinylidene Chloride				
–moulding compound	TP	SE	A	Chlorine, Hydrochloric Acid

Notes: (1) TP – Thermoplastic
TS – Thermosetting
(2) SE – Self-extinguishing
(3) Groups A, B, C and D are defined in article 2.3.6.1., sentence (1)

TABLE A-2

HAZARDOUS CHEMICALS

SUBSTANCE	HAZARD
ACETATES, organic	Flammable liquids.
Acetic Acid (glacial)	Flammable material; dangerous in contact with sodium peroxide, nitric acid or barium peroxide; flash point 104°F.
Acetic Anhydride	Flammable material and corrosive liquid; quite reactive with water, sulphuric acid, or powerful oxidizing agents.
Acetylene	Compressed gas; flammable.
Acetyl Bromide	Fuming corrosive liquid.
Acetyl Chloride	Fuming corrosive liquid.
Acetyl Iodide	Fuming corrosive liquid.
ACIDS, mineral (concentrated)	Corrosive liquids; some may evolve toxic fumes.
ACIDS, organic	Combustible liquids or solids.
Acrolein	Flammable liquid; fumes are toxic.
Acrylonitrile	Flammable liquid; fumes are toxic. *See* NITRILES.
ALCOHOLS	Flammable liquids.
ALDEHYDES	Flammable liquids or combustible solids.
Alfalfa Meal	Flammable material highly susceptible to spontaneous heating.
ALKALI METALS	Flammable materials; react explosively with water; must be stored under a hydrocarbon liquid.
ALLYL COMPOUNDS	Fumes are generally toxic.
Aluminum Carbide	Flammable material; decomposes on contact with water or moisture to evolve methane.
Aluminum Powder	Flammable material; forms flammable and explosive mixtures with air.
AMINES	Flammable liquids.
Ammonia, anhydrous	Compressed gas; flammable and very irritating.
Ammonium Dichromate	Flammable material; may react explosively with certain organic compounds.
Ammonium Nitrate	Powerful oxidizing agent and explosive material; often explodes under apparently mysterious circumstances.
Ammonium Perchlorate	Powerful oxidizing agent; extremely unstable; heat or shock can cause it to decompose with explosive violence.
Ammonium Permanganate	Powerful oxidizing agent.

SUBSTANCE	HAZARD
Ammonium Persulphate	Powerful oxidizing agent; sensitive to heat and shock.
Ammonium Picrate	Explosive.
ANHYDRIDES	Flammable materials; some may react violently with water.
Aniline	Flammable liquid subject to spontaneous heating; fumes are toxic.
Antimony Pentachloride	Corrosive liquid; gives off hydrogen chloride in presence of moist air.
Antimony Pentasulphide	Combustible solid readily ignitable by a small flame; yields hydrogen sulphide on contact with mineral acids.
Aqua Regia	Corrosive liquid; attacks metals with evolution of hydrogen.
ARSENICAL COMPOUNDS	Poisons.
Arsine	Extremely poisonous gas.
BAGS and SACKS (empty)	Combustible solids; may be liable to spontaneous combustion if previously used as containers for nitrates, sugar or oily materials.
Barium	Flammable material; liberates large quantities of hydrogen in presence of water. *See* ALKALI METALS.
Barium Chlorate	Powerful oxidizing agent.
Barium Nitrate	Powerful oxidizing agent.
Barium Perchlorate	Powerful oxidizing agent; may explode on contact with combustible materials.
Barium Permanganate	Powerful oxidizing agent.
Barium Peroxide	Powerful oxidizing agent.
BENZOATES	Combustible solids.
Benzoic Acid	Combustible solid.
Benzonitrile	*See* NITRILES.
Benzoyl Chloride	Corrosive liquid; fumes are very irritating.
Benzoyl Peroxide	Powerful oxidizing agent.
Benzyl Chloride	Corrosive liquid.
Bitumen	Combustible solid.
Blasting Powders	Slow-acting explosives.
Bleaching Powder	*See* Chlorinated Lime.
Bone Oil	Flammable material; subject to spontaneous heating.
BROMATES	Powerful oxidizing agents.

SUBSTANCE	HAZARD
Bromic Acid	Corrosive liquid.
BROMIDES, organic	Most are flammable materials; yield toxic gases when subjected to heat or flame.
Bromine	Very corrosive liquid; may produce fire upon contact with organic matter; fumes are toxic.
Butadiene	Flammable gas; may form explosive peroxides on exposure to air.
Butane	Liquefied petroleum gas.
Calcium	Flammable material; reacts with moisture and acids to liberate large quantities of hydrogen. *See* ALKALI METALS.
Calcium Carbide	Flammable material; reacts with moisture to liberate acetylene.
Calcium Chlorate	Powerful oxidizing agent.
Calcium Cyanide	*See* CYANIDES.
Calcium Hydride	Flammable material; decomposes in moist air to liberate hydrogen.
Calcium Nitrate	Powerful oxidizing agent.
Calcium Oxide	Very caustic; reacts violently with water liberating sufficient heat to start fire.
Calcium Phosphide	Flammable material; reacts with water to liberate phosphine, a flammable and poisonous gas.
Camphor	Flammable material; fumes are toxic; gives off flammable vapours when heated.
Carbon Dioxide	Compressed gas; non-flammable.
Carbon Monoxide	Poisonous gas.
Carbonyl Bromide	Volatile liquid; vapours are classified with poisonous gases.
Carbonyl Chloride (Phosgene)	Extremely poisonous gas.
Carbonyl Cyanide	Unstable in the presence of water; fumes are toxic. *See* CYANIDES
Carbonyl Fluoride	Unstable in the presence of water; fumes are toxic.
Castor Oil	Flammable material; may be subject to spontaneous heating.
Celluloid	Flammable solid. *See* Nitrocellulose.
Cellulose Acetate	Combustible solid.
Cellulose Nitrate	*See* Nitrocellulose.
Ceric Ammonium Nitrate	Powerful oxidizing agent.
Cesium	*See* ALKALI METALS.

SUBSTANCE	HAZARD
Charcoal (activated carbon)	Freshly calcined material ignites spontaneously when exposed to air or when wet.
CHLORATES	Powerful oxidizing agents; liberate oxygen explosively under influence of friction, shock, or heat.
CHLORIDES, organic	Most are flammable and yield toxic fumes on exposure to heat or flame.
CHLORINATED HYDROCARBONS	Most evolve toxic fumes, particularly when exposed to heat or flame.
Chlorinated Lime	Oxidizing agent; yields chlorine gas on contact with acids or moisture.
Chlorine	Compressed gas; toxic; supports combustion.
CHLORITES	Powerful oxidizing agents.
Chloroacetyl Chloride	Corrosive liquid; fumes are toxic.
Chloroform	Anesthetic; non-flammable but toxic.
Chloropicrin	Poisonous gas.
Chlorosulphonic Acid	Corrosive liquid; reacts with water to liberate hydrogen chloride.
Chlorotrifluoromethane	Non-flammable refrigerant; non-toxic and non-corrosive.
Chromic Acid, crystals	Powerful oxidizing agent; may react explosively with organic substances.
Chromic Acid, solution	Corrosive liquid.
Coal Tar	Combustible liquid or semi-solid.
Cobaltous Nitrate	Powerful oxidizing agent.
Coconut Oil, refined	Flammable material; may be subject to spontaneous heating.
Cod Liver Oil	Flammable material; highly susceptible to spontaneous heating.
Collodion	Highly flammable liquid. *See* Nitrocellulose.
Compressed Air	Compressed gas; supports combustion.
Copper Chlorate	Powerful oxidizing agent. *See* CHLORATES.
Copper Nitrate	Powerful oxidizing agent.
Corn Meal Feeds	Usually contain an appreciable quantity of oil and may ignite spontaneously.
Corn Oil (Maize Oil)	Flammable material; susceptible to spontaneous heating.
Cottonseed Oil	Flammable material; highly susceptible to spontaneous heating.
Creosote Oil	Combustible liquid; fumes are toxic.
CRESOLS	Combustible materials; fumes are toxic.

SUBSTANCE	HAZARD
CYANIDES	Extremely poisonous; react with acids and sometimes with moisture to give off hydrocyanic acid, a poisonous gas.
CYANO or CYANOGEN COMPOUNDS	Toxic materials.
Cyanogen	Poisonous gas.
Cyclohexanol	Flammable liquid; fumes are toxic.
Cyclohexanone	Flammable liquid; fumes are toxic.
Cyclonite	High explosive.
Cyclopropane	Anesthetic; highly flammable gas.
Dichloroethylene	Refrigerant gas; flammable; can form violently explosive peroxides in presence of air.
Didymium Nitrate	Powerful oxidizing agent.
Diethyl Carbonate	Combustible liquid.
Dimethyl Sulphate	Corrosive liquid; fumes are very toxic.
Ethane	Compressed gas; highly flammable; refrigerant.
ETHERS	Some are quite volatile and highly flammable; fumes are toxic; may form explosive peroxides during storage.
Ether	*See* Ethyl Ether.
Ethyl Bromide	Anesthetic and refrigerant; flammable and toxic.
Ethyl Chloride	Anesthetic and refrigerant gas; flammable and toxic.
Ethyl Chlorocarbonate	Corrosive liquid.
Ethylene	Anesthetic gas; highly flammable.
Ethylene Bromide (or Dibromide)	Quite volatile and highly toxic; non-flammable.
Ethylene Oxide	Compressed gas; highly flammable; fumigant.
Ethyl Ether	Quite volatile and highly flammable liquid; tends to form explosive peroxides during storage.
Ethyl Nitrate	Flammable liquid.
Ethyl Nitrite	Flammable liquid.
FEEDS, various	Flammable materials; may self-heat and ignite spontaneously if not cooled properly before storage.
FIBRES, vegetable	Flammable solids; particularly hazardous when containing animal or vegetable oil.

SUBSTANCE	HAZARD
Fish Meal	Flammable material; may self-heat if overdried or packaged at a temperature above 100°F.
Fish Oil	Flammable material highly susceptible to spontaneous heating.
Fish Scrap	Flammable material; may self-heat if overdried.
FLUORIDES, inorganic	Noncombustible but poisonous.
Fluorine	Compressed gas; toxic; supports combustion.
FLUOROCARBONS	Generally non-flammable and non-toxic; may however decompose at high temperatures to yield toxic products.
Fluosilicic Acid	Corrosive liquid.
Fluosulphonic Acid	Corrosive liquid; fumes are toxic.
Formaldehyde, solution	Highly flammable liquid; fumes are very toxic; reaction with oxidizing materials yields formaldehyde gas and may produce sufficient heat to ignite nearby combustible materials.
Formalin	*See* Formaldehyde, solution.
Formic Acid	Corrosive liquid.
French Polish	Highly flammable material.
Freon	Compressed gas; non-flammable. *See* FLUOROCARBONS.
FULMINATES	Explosives.
FUMIGANTS	Toxic materials; some may also be flammable substances.
Glyceryl Trinitrate	Explosive. *See* Nitroglycerin.
Guanidine Nitrate	Powerful oxidizing agent.
Hexafluorophosphoric Acid	Corrosive liquid.
Hexamethylenediamine, solution	Corrosive liquid.
Hydrazine	Flammable and corrosive liquid; unstable; vapour is explosive and highly toxic.
Hydrazine Hydrate	Flammable and corrosive liquid; vapour is explosive and highly toxic.
HYDRIDES	Flammable materials; most react with moisture to release hydrogen.
Hydriodic Acid	Corrosive liquid.
Hydrobromic Acid	Corrosive liquid.
HYDROCARBONS	Flammable liquids or combustible solids.
Hydrochloric Acid	Corrosive liquid; fumes are toxic.

SUBSTANCE	HAZARD
Hydrocyanic Acid	Poisonous gas; highly flammable; fumigant.
Hydrofluoric Acid	Corrosive liquid; fumes are extremely toxic.
Hydrofluosilicic Acid	*See* Fluosilicic Acid.
Hydrogen	Compressed gas; flammable.
Hydrogen Bromide	*See* Hydrobromic Acid.
Hydrogen Chloride	*See* Hydrochloric Acid.
Hydrogen Cyanide	*See* Hydrocyanic Acid.
Hydrogen Fluoride	*See* Hydrofluoric Acid.
Hydrogen Iodide	*See* Hydriodic Acid.
Hydrogen Peroxide	Powerful oxidizing agent; corrosive liquid; concentrated solutions may react explosively with combustible materials.
Hydrogen Sulphide	Compressed gas; highly flammable and toxic.
Hydroxylamine	Flammable material; may decompose explosively when heated to a temperature of 265°F.
HYPOCHLORITES	Powerful oxidizing agents; liable to explode when warmed or placed in contact with organic matter.
HYPOPHOSPHITES	Flammable materials; decompose when heated to yield phosphine; form powerful explosives with oxidizing materials.
INSECTICIDES	Toxic materials; generally dissolved in a flammable liquid.
IODATES	Powerful oxidizing agents.
Iodic Acid	Corrosive liquid and oxidizing agent.
Iodine Monochloride	Corrosive liquid.
Iodine Tribromide	Corrosive liquid; fumes are toxic.
Iron Pentacarbonyl	Flammable material; decomposes on exposure to air with the possibility of spontaneous ignition; must be stored under water or under an atmosphere of nitrogen.
Iron Sponge	Flammable material.
Isobutane	Compressed gas; highly flammable; refrigerant.
Jute	Combustible fibre.
Kapok	Combustible fibre.
Ketene	Poisonous gas.

SUBSTANCE	HAZARD
Lampblack	Flammable material subject to spontaneous ignition when in a damp condition.
Lanolin	Flammable material; may be subject to spontaneous heating.
Lard Oil	Flammable material highly susceptible to spontaneous heating.
Lauroyl Peroxide	Powerful oxidizing agent.
Lead Azide	Explosive.
LEAD COMPOUNDS	Toxic materials.
Lead Dioxide	Powerful oxidizing agent.
Lead Nitrate	Powerful oxidizing agent.
Lime, unslaked	*See* Calcium Oxide.
Linseed Oil	Flammable material highly susceptible to spontaneous heating.
Litharge	*See* LEAD COMPOUNDS.
Lithium	Flammable material; reacts vigorously with acids or water to liberate hydrogen gas. *See* ALKALI METALS.
Lithium Aluminum Hydride	Flammable material; liberates hydrogen on exposure to moist air. *See* HYDRIDES.
Lithium Amide	Flammable material; decomposes on contact with water.
Lithium Hydride	Flammable material. *See* HYDRIDES.
Lithium Hypochlorite	Powerful oxidizing agent.
Lithium Nitrate	Powerful oxidizing agent.
Lithium Peroxide	Powerful oxidizing agent.
Lithium Silicon	Flammable material; liberates hydrogen on exposure to moist air.
Lubricating Oil	Combustible liquid; may be subject to spontaneous heating.
Magnesium	Highly flammable material; can cause explosions when in a finely divided state.
Magnesium Bromate	Powerful oxidizing agent.
Magnesium Chlorate	Powerful oxidizing agent.
Magnesium Nitrate	Powerful oxidizing agent.
Magnesium Perborate	Powerful oxidizing agent.
Magnesium Perchlorate	Powerful oxidizing agent.
Magnesium Peroxide	Powerful oxidizing agent.
Magnesium Scrap (shavings, borings, turnings)	*See* Magnesium.

SUBSTANCE	HAZARD
Maize Oil	*See* Corn Oil.
Matches, strike-anywhere	Flammable material.
Menhaden Oil	Flammable material highly susceptible to spontaneous heating.
Mercuric Nitrate	Oxidizing agent.
Mercuric Perchlorate	Powerful oxidizing agent.
Mercurous Chlorate	Powerful oxidizing agent.
MERCURY COMPOUNDS	Toxic materials.
Mercury Fulminate	*See* FULMINATES.
METAL POWDERS	Flammable materials when in a finely divided form; may be subject to spontaneous heating; dust may constitute an explosion hazard.
Methyl Bromide	Compressed gas; non-flammable but toxic; fumigant.
Methyl Chloride	Compressed gas; flammable; refrigerant; decomposed by flame to yield hydrogen chloride and phosgene, a poisonous gas.
Methyl Chloroformate	Corrosive liquid.
Methyl Chlorosulphonate	Corrosive liquid.
Methyl Cyanide	*See* CYANIDES.
Methyl Cyanoformate	Decomposed by alkalies or water to yield formic acid and methyl cyanide.
Methylene Chloride	Compressed gas or highly volatile liquid; non-flammable. *See* CHLORIDES, organic.
Methyl Fluoroformate	Corrosive liquid.
Methyl Fluorosulphonate	Corrosive liquid.
Methyl Formate	Flammable liquid; fumes are toxic; fumigant.
Methyl Iodide	Flammable liquid; fumes are toxic.
Methyl Methacrylate	Flammable liquid; fumes are toxic.
Methyl Nitrate	Explosive.
Mineral Oil	*See* Lubricating Oil.
Mixed Acid	Mixture of sulphuric and nitric acids; highly corrosive liquid; fumes are very toxic.
Monofluorophosphoric Acid	Corrosive liquid.
Mustard Oil	Flammable material highly susceptible to spontaneous heating.
Neatsfoot Oil	Flammable material; may be subject to spontaneous heating.
Nickel Ammonium Nitrate	Powerful oxidizing agent; may decompose with violence.

SUBSTANCE	HAZARD
Nickel Carbonyl	Flammable material; very toxic; readily decomposed by heat into metallic nickel and carbon monoxide.
Nickel Nitrate	Powerful oxidizing agent.
Nickel Peroxide	Powerful oxidizing agent.
Nitraniline or Nitroaniline	Highly toxic material; in the presence of moisture it can react with organic materials and cause spontaneous ignition.
NITRATES, inorganic	Powerful oxidizing agents; yield oxygen on exposure to heat; can cause fires and explosions upon contact with readily oxidizable materials.
Nitrating Acid	*See* Mixed Acid.
Nitric Acid	Powerful oxidizing agent and highly corrosive fuming liquid; fumes are highly toxic; may cause fires and explosions upon contact with readily oxidizable materials.
NITRILES	Organic cyanides. *See* CYANIDES.
NITRITES, inorganic	Powerful oxidizing agents.
Nitrobenzene	Flammable material; may be subject to spontaneous heating; fumes are very toxic.
Nitrobenzol	*See* Nitrobenzene.
Nitro Carbo Nitrate	Powerful oxidizing agent.
Nitrocellulose	Highly flammable material; can be explosive if dry.
Nitrogen Chloride	Flammable material; very explosive and sensitive to shock and vibration; decomposes explosively if temperature is raised above 140°F; fumes are toxic.
Nitrogen Dioxide	Poisonous gas; corrosive; supports combustion.
Nitrogen Tetroxide	*See* Nitrogen Dioxide.
Nitroglycerin	Explosive.
Nitroguanidine	Explosive.
Nitrohydrochloric Acid	*See* Aqua Regia.
Nitromannite	Explosive.
Nitrosyl Sulphuric Acid	Corrosive liquid.
Nitrotrichloromethane	*See* Chloropicrin.
Nitrourea	Explosive.
Nitrous Oxide	Compressed gas; non-flammable; supports combustion; weak anesthetic.
Oiled clothing, fabrics, rags or silk	Flammable materials subject to spontaneous heating.
Oleic Acid	Flammable material susceptible to spontaneous heating.

SUBSTANCE	HAZARD
Oleo Oil	Flammable material; may be subject to spontaneous heating.
Oleum	Corrosive liquid; fumes are quite toxic. *See* Sulphuric Acid.
Olive Oil	Flammable material; may be subject to spontaneous heating.
Oxygen	Compressed gas; non-flammable; supports combustion.
Paint containing drying oils	Flammable material highly susceptible to spontaneous heating.
Paint Scrapings	Flammable material susceptible to spontaneous heating.
Palm Kernel Oil	Flammable material susceptible to spontaneous heating.
Palm Oil	Flammable material susceptible to spontaneous heating.
Paraffin Oils	Combustible liquids.
Paraffin Wax	Combustible solid.
Paraformaldehyde	Flammable material; evolves formaldehyde gas upon heating.
Peanut Oil	Flammable material susceptible to spontaneous heating.
Peracetic Acid	Powerful oxidizing agent.
PERBORATES	Weak oxidizing agents.
PERCHLORATES	Powerful oxidizing agents; unstable materials.
Perchloric Acid	Corrosive liquid; concentrated solutions are dangerously explosive if allowed to come in contact with oxidizable materials.
Perchromic Acid	Powerful oxidizing agent.
Perilla Oil	Flammable material highly susceptible to spontaneous heating.
Periodic Acid	Powerful oxidizing agent.
PERMANGANATES	Powerful oxidizing agents.
PEROXIDES, inorganic	Powerful oxidizing agents; decompose easily in presence of heat or moisture to liberate free oxygen.
PEROXIDES, organic	Flammable materials and powerful oxidizing agents.
PERSULPHATES	Powerful oxidizing agents.
Phenol	Fumes are flammable, corrosive and highly toxic.

SUBSTANCE	HAZARD
Phenolsulphonic Acid	Very corrosive liquid; fumes are toxic.
Phosgene	Poisonous gas.
PHOSPHIDES	Flammable materials; yield phosphine on contact with moisture.
Phosphine	Poisonous gas; highly flammable.
Phosphoric Acid	Corrosive liquid; fumes are toxic.
Phosphoric Anhydride	Flammable material; reacts violently with water producing sufficient heat to ignite nearby combustible materials.
Phosphorus, white or yellow	Flammable material; ignites spontaneously in air and explodes on contact with oxidizing materials; very toxic.
Phosphorus, red	Flammable material; can be ignited by friction.
Phosphorus Oxychloride	Corrosive liquid; reacts violently with water; fumes are toxic.
Phosphorus Pentachloride	Flammable material; liberates phosphoric acid and hydrogen chloride on contact with moisture; corrosive.
Phosphorus Pentasulphide	Flammable material; can be ignited by friction and burns in air to form phosphoric anhydride and sulphur dioxide.
Phosphorus Sesquisulphide	Flammable solid.
Phosphorus Tribromide	Corrosive liquid; reacts violently with moisture to liberate hydrogen bromide.
Phosphorus Trichloride	Corrosive liquid; reacts violently with moisture to liberate hydrogen chloride.
PICRATES	Explosives.
Picric Acid	Explosive.
Pine Oil	Flammable material susceptible to spontaneous heating.
Pine Tar Oil	Flammable material susceptible to spontaneous heating.
Potassium, metallic	*See* ALKALI METALS.
Potassium Ammonium Nitrate	Powerful oxidizing agent.
Potassium Bromate	Powerful oxidizing agent.
Potassium Chlorate	Powerful oxidizing agent.
Potassium Cyanide	*See* CYANIDES.
Potassium Hydroxide	Generates heat on contact with water; corrosive liquid when in solution.
Potassium Hypophosphite	*See* HYPOPHOSPHITES.
Potassium Nitrate	Powerful oxidizing agent.
Potassium Nitrite	Powerful oxidizing agent.

SUBSTANCE	HAZARD
Potassium Perchlorate	Powerful oxidizing agent; decomposed by concussion, organic matter or other oxidizable materials.
Potassium Permanganate	Powerful oxidizing agent.
Potassium Peroxide	Powerful oxidizing agent. *See* PEROXIDES, inorganic.
Potassium Persulphate	Powerful oxidizing agent.
Potassium Sulphide	Flammable material; liberates hydrogen sulphide on contact with mineral acids.
Propane	Liquefied petroleum gas; highly flammable; refrigerant.
Pyrosulphuryl Chloride	Corrosive liquid; decomposes violently with water into sulphuric acid and hydrochloric acid.
Pyroxylin	*See* Nitrocellulose.
Rags, oily	Flammable materials susceptible to spontaneous heating.
Rape (or Rapeseed) Oil	Flammable material highly susceptible to spontaneous heating.
Red Oil	*See* Oleic Acid.
RESINATES	Flammable materials; some are subject to spontaneous heating when moist.
Rosin Oil	Flammable material highly susceptible to spontaneous heating.
Rubber, reclaimed	Combustible solid.
Rubber Scrap or Buffings	Combustible solid.
Rubidium	*See* ALKALI METALS.
Rubidium Hydroxide	Corrosive liquid when in solution.
Rust-preventing or Rust-removing compounds	Corrosive liquids.
Salicylic Acid	Combustible solid; dust forms explosive mixtures with air.
Sawdust	Combustible solid; may be subject to spontaneous heating when charred or partially burned.
SEEDS	Oily seeds are susceptible to spontaneous heating.
SELENIUM COMPOUNDS	Highly toxic materials.
Silicon Chloride	Corrosive liquid; evolves hydrogen chloride on exposure to moist air.
Silver Nitrate	Powerful oxidizing agent.
Silver Permanganate	Powerful oxidizing agent.

SUBSTANCE	HAZARD
Sisal	Combustible fibre.
Sodium, metallic	*See* ALKALI METALS.
Sodium Amalgam	Flammable material; may evolve hydrogen on contact with water. *See* MERCURY COMPOUNDS.
Sodium Amide	Flammable material; very unstable; decomposes on contact with moisture.
Sodium Azide	Flammable material; may decompose with explosive violence when exposed to heat or shock; very toxic.
Sodium Bromate	Powerful oxidizing agent.
Sodium Chlorate	Powerful oxidizing agent.
Sodium Chlorite	Powerful oxidizing agent.
Sodium Cyanide	Corrosive and extremely poisonous. *See* CYANIDES.
Sodium Hydride	Flammable material. *See* HYDRIDES.
Sodium Hydrosulphite	Flammable material susceptible to spontaneous heating in presence of moisture.
Sodium Hydroxide	Generates heat on contact with water; corrosive liquid when in solution.
Sodium Hypophosphite	Flammable material. *See* HYPOPHOSPHITES.
Sodium Nitrate	Powerful oxidizing agent.
Sodium Nitrite	Powerful oxidizing agent.
Sodium Perborate	*See* PERBORATES.
Sodium Perchlorate	Powerful oxidizing agent; decomposed by concussion, organic matter or other oxidizable materials.
Sodium Permanganate	Powerful oxidizing agent.
Sodium Peroxide	Powerful oxidizing agent; reacts violently with water to liberate free oxygen.
Sodium Sulphide	Flammable material; liberates hydrogen sulphide on contact with mineral acids.
Soya Bean Oil	Flammable material highly susceptible to spontaneous heating.
Spent Acid	Corrosive liquid.
Spent Oxide	Combustible solid; fertilizer.
Sperm Oil	Flammable material susceptible to spontaneous heating.
Stannic Chloride	Reacts with moist air to liberate hydrogen chloride; corrosive liquid when in solution.
Strontium	Flammable material; liberates hydrogen on contact with moisture. *See* ALKALI METALS.

SUBSTANCE	HAZARD
Strontium Chlorate	Powerful oxidizing agent.
Strontium Nitrate	Powerful oxidizing agent.
Strontium Peroxide	Powerful oxidizing agent.
Succinic Acid Peroxide	Powerful oxidizing agent. *See* PEROXIDES, organic.
Sugar Beet, dried	Flammable material susceptible to spontaneous heating.
SULPHIDES	Flammable materials; evolve hydrogen sulphide on exposure to acid fumes; susceptible to spontaneous heating if stored in bulk in a moist condition.
Sulphur	Combustible solid; dust may form explosive mixtures with air.
Sulphur Chloride	Corrosive liquid; flammable.
Sulphur Dichloride	Corrosive liquid.
Sulphur Dioxide	Compressed gas; corrosive and poisonous.
Sulphuric Acid	Very corrosive liquid; powerful oxidizing agent; fumes are toxic.
Sulphur Trioxide	Corrosive liquid. *See* Sulphuric Acid.
Sulphuryl Chloride	Corrosive liquid when in solution; decomposed by water to sulphuric and hydrochloric acids.
Tallow	Flammable material susceptible to spontaneous heating.
Tallow Oil	Flammable material susceptible to spontaneous heating.
Tetraethyl Lead	Flammable liquid; vapour is highly toxic.
Tetramethyl Lead	Flammable liquid; vapour is highly toxic.
THALLIUM COMPOUNDS	Toxic materials.
Thionyl Chloride	Corrosive liquid; decomposes into hydrogen chloride and sulphur dioxide on exposure to moist air.
Thiophosphoryl Chloride	Corrosive liquid.
Thorium	Flammable and radioactive material.
Thorium Nitrate	Powerful oxidizing agent.
Titanium Dichloride	Highly flammable material; liberates hydrogen chloride on exposure to moist air.
Titanium Tetrachloride	Corrosive liquid; liberates hydrogen chloride on exposure to moist air.
Titanium Trichloride	Corrosive liquid.
Titanous sulphate, solution	Corrosive liquid.

SUBSTANCE	HAZARD
Tung Nut Meals	Flammable material susceptible to spontaneous heating.
Tung Oil (China Wood Oil)	Flammable material highly susceptible to spontaneous heating.
URANIUM COMPOUNDS	Highly toxic materials; some are strongly radioactive.
Uranium Nitrate	Powerful oxidizing agent.
Varnished Fabrics	Susceptible to spontaneous heating if not completely dry.
Vinyl Ether	Quite volatile and highly flammable liquid; anesthetic.
Whale Oil	Flammable material highly susceptible to spontaneous heating.
Woodwool	Combustible solid; easily ignited and burns fiercely.
Wool Wastes	Flammable materials which contain oil; susceptible to spontaneous heating and possible ignition particularly when wet.
Zinc Ammonium Nitrate	Powerful oxidizing agent.
Zinc Bromate	Powerful oxidizing agent.
Zinc Chlorate	Powerful oxidizing agent.
Zinc Iodate	Powerful oxidizing agent.
Zinc Nitrate	Powerful oxidizing agent.
Zinc Permanganate	Powerful oxidizing agent.
Zinc Peroxide	Powerful oxidizing agent.
Zinc Dust (or Powder)	Flammable material; may spontaneously ignite in air; reacts with acids to liberate hydrogen gas.
Zirconium Powder	Flammable material; can ignite explosively in air or when in contact with organic matter.