Table 1.3.1.2.
Documents Referenced in the British Columbia Fire Code 2012
Forming part of Sentence 1.3.1.2.(1)

Issuing Agency	Document Number[1]	Title of Document[2]	Code Reference
ULC	<CAN/>ULC-S652-<08>	Tank Assemblies for <the> Collection<, Storage and Removal> of Used Oil	4.3.1.2.(1)
ULC	<CAN/>ULC-S653-<06>	Aboveground Steel Contained Tank Assemblies for Flammable and Combustible Liquids	4.3.1.2.(1)
ULC	ULC-S655-98	Aboveground Protected Tank Assemblies for Flammable and Combustible Liquids	4.3.1.2.(1) 4.3.2.1.(7) 4.6.2.1.(3)
<ULC>	<CAN/ULC-S660-08>	<Nonmetallic Underground Piping for Flammable and Combustible Liquids>	<4.5.2.1.(3) 4.5.6.14.(2)>
<ULC>	<ULC-S661-10>[5]	<Overfill Protection Devices for Flammable and Combustible Liquid Storage Tanks>	<4.3.1.8.(1) 4.3.1.8.(2)>
ULC	ULC/ORD-C30-1995	Safety Containers	4.1.5.8.(2) 4.2.3.1.(1) 4.2.6.4.(1) 5.5.5.2.(2)
<ULC>	<ULC/ORD-C58.19-1992>	<Spill Containment Devices for Underground Flammable Liquid Storage Tanks>	<4.3.9.2.(2)>
ULC	ULC/ORD-C107.12-1992	Line Leak Detection Devices for Flammable Liquid Piping	4.4.2.1.(11) 4.4.3.4.(2) 4.4.4.2.(1)
ULC	ULC/ORD-C107.21-1992	Under-Dispenser Sumps	4.3.9.2.(1) 4.6.3.2.(1)
ULC	ULC/ORD-C142.5-1992	Concrete Encased Steel Aboveground Tank Assemblies for Flammable and Combustible Liquids	4.3.1.2.(1)
ULC	ULC/ORD-C536-1998	Flexible Metallic Hose	4.5.6.14.(2)
ULC	ULC/ORD-C558-<2009>	<Guide for the Investigation of Industrial Trucks,> Internal Combustion Engine-Powered	3.1.3.1.(2)
ULC	ULC/ORD-C583-<2009>	<Guide for the Investigation of> Electric Battery Powered Industrial Trucks	3.1.3.1.(3)
ULC	ULC/ORD-C842-84	<Guide for the Investigation of> Valves for Flammable and Combustible Liquids	4.5.7.1.(1)
ULC	ULC/ORD-C1275-84	Storage Cabinets for Flammable Liquid Containers	4.2.10.5.(1)

Notes to Table 1.3.1.2.:
(1) Some documents may have been reaffirmed or reapproved. Check with the applicable issuing agency for up-to-date information.
(2) Some titles have been abridged to omit superfluous wording.
(3) Code reference is in Division A.
(4) Code reference is in Division C.
(5) This standard replaces ULC/ORD-C58.15-1992.

1.3.2. Organizations

1.3.2.1. Abbreviations of Proper Names

1) The abbreviations of proper names in this Code shall have the meanings assigned to them in this Article (the appropriate addresses of the organizations are shown in brackets).

ACGIH	American Conference of Governmental Industrial Hygienists (1330 Kemper Meadow Drive, Cincinnati, Ohio 45240-1634 U.S.A.; www.acgih.org)
API	American Petroleum Institute (1220 L Street NW, Washington, D.C. 20005-4070 U.S.A.; www.api.org)
ASME	American Society of Mechanical Engineers (Three Park Avenue, New York, New York 10016-5990 U.S.A.; www.asme.org)
ASTM	American Society for Testing and Materials International (100 Barr Harbor Drive, West Conshohocken, Pennsylvania 19428-2959 U.S.A.; www.astm.org)
<BCBC	British Columbia Building Code 2012**>**
CCBFC	Canadian Commission on Building and Fire Codes (National Research Council of Canada, Ottawa, Ontario K1A 0R6; www.nationalcodes.ca)
CCME	Canadian Council of Ministers of the Environment (360-123 Main Street, Winnipeg, Manitoba R3C 1A3; www.ccme.ca)
CGA	Compressed Gas Association (4221 Walney Road, 5th Floor, Chantilly, Virginia 20151-2923 U.S.A.; www.cganet.com)
CGSB	Canadian General Standards Board (Place du Portage, Phase III, 6B1, 11 Laurier Street, Gatineau, Quebec K1A 1G6; www.pwgsc.gc.ca/cgsb)
CNSC	Canadian Nuclear Safety Commission (280 Slater Street, P.O. Box 1046, Station B, Ottawa, Ontario K1P 5S9; www.cnsc.gc.ca)
CPPI	Canadian Petroleum Products Institute (275 Slater Street, Suite 1000, Ottawa, Ontario K1P 5H9; www.cppi.ca)
CSA	Canadian Standards Association (5060 Spectrum Way, Suite 100, Mississauga, Ontario L4W 5N6; www.csa.ca)
EPA	Environmental Protection Agency (1200 Pennsylvania Avenue NW, Washington, D.C. 20460 U.S.A.; www.epa.gov)
FM Global	FM Global (1151 Boston-Providence Turnpike, P.O. Box 9102, Norwood, Massachusetts 02062 U.S.A.; www.fmglobal.com)
HC	Health Canada (Address Locator 0900C2, Ottawa, Ontario K1A 0K9; www.hc-sc.gc.ca)
IMO	International Maritime Organization (4 Albert Embankment, London, SE1 7SR United Kingdom; www.imo.org)
NBC	National Building Code of Canada 2010 (see CCBFC)
NFPA	National Fire Protection Association (1 Batterymarch Park, Quincy, Massachusetts 02169-7471 U.S.A.; www.nfpa.org)
NRC	National Research Council of Canada (Ottawa, Ontario K1A 0R6; www.nrc-cnrc.gc.ca)
NRCan	Natural Resources Canada (580 Booth Street, Ottawa, Ontario K1A 0E4; www.nrcan-rncan.gc.ca)
NRC-IRC	Institute for Research in Construction (National Research Council of Canada, Ottawa, Ontario K1A 0R6; irc.nrc-cnrc.gc.ca)
OCIMF	Oil Companies International Marine Forum (27 Queen Anne's Gate, London, SW1H 9BU United Kingdom; www.ocimf.com)
RMA	Rubber Manufacturers Association, Inc. (1400 K Street NW, Suite 900, Washington, D.C. 20005 U.S.A.; www.rma.org)
SFPE	Society of Fire Protection Engineers (7315 Wisconsin Avenue, Suite 620E, Bethesda, Maryland 20814 U.S.A.; www.sfpe.org)
TC	Transport Canada (330 Sparks Street, Ottawa, Ontario K1A 0N5; www.tc.gc.ca)
UL	Underwriters Laboratories Inc. (333 Pfingsten Road, Northbrook, Illinois 60062-2096 U.S.A.; www.ul.com)
ULC	Underwriters Laboratories of Canada (7 Underwriters Road, Toronto, Ontario M1R 3B4; www.ulc.ca)
UN	United Nations (UN Headquarters, 760 United Nations Plaza, New York, New York 10017 U.S.A.; www.un.org)

Table 2.16.1.1.
Objectives and Functional Statements Attributed to the Acceptable Solutions in Part 2
Forming part of Sentence 2.16.1.1.(1)

Acceptable Solutions	Functional Statements and Objectives[1]
(3)	[F82-OP1.2]
	[F82-OS1.2]
(4)	[F81-OP1.2]
	[F81-OS1.2]
(5)	[F82-OP1.2]
	[F82-OS1.1]
2.2.2.5. Fire Door Signs	
<(1)>	<[F02,F03,F05-OS1.2]>
2.3.1.2. Movable Partitions and Screens	
(1)	[F02-OS1.2]
2.3.1.3. Decorative Materials	
(1)	[F02-OS1.2]
2.3.1.4. Interconnected Floor Spaces	
(1)	[F02-OP1.2]
	[F02-OS1.2]
2.3.1.5. Combustible Materials in Classrooms	
<(1)>	<[F03-OS1.2]>
2.3.2.1. Drapes, Curtains and Decorative Materials	
(1)	[F02-OP1.2]
	[F02-OS1.2,OS1.5]
2.3.2.2. Flame Retardant Treatments	
(1)	[F82-OP1.2]
	[F82-OS1.2,OS1.5]
2.3.2.3. Textiles in Group B Occupancies	
(1)	[F02-OP1.2]
	[F02-OS1.2]
(2)	[F02,OP1.2]
	[F02-OS1.2]
2.4.1.1. Accumulation of Combustible Materials	
(1)	[F01,F02-OS1.2,OS1.1]
	[F01,F02-OP1.2,OP1.1]
(2)	[F01,F02-OS1.2]
	[F01,F02-OP1.2]
(3)	[F01,F02-OS1.2]
	[F01,F02-OP1.2]
(4)	[F01,F02-OS1.2]
	[F01,F02-OP1.2]
(5)	[F02-OS1.2]
	[F02-OP1.2]

Table 2.16.1.1.
Objectives and Functional Statements Attributed to the Acceptable Solutions in Part 2
Forming part of Sentence 2.16.1.1.(1)

Acceptable Solutions	Functional Statements and Objectives[1]
(6)	[F01-OS1.2,OS1.1]
	[F01,F02-OP1.2,OP1.1]
2.4.1.2. Storage Rooms for Combustible Waste Materials	
(1)	[F03,F02-OS1.2]
	[F03,F02-OP1.2]
2.4.1.3. Waste Receptacles	
(1)	[F01-OS1.1] Applies to portion of Code text: "… be removed from the premises."
(2)	[F01-OS1.1] Applies to the storage of combustible materials and ashes in the same container.
(3)	[F03-OS1.2]
	[F03-OP1.2]
(4)	[F03,F02,F01-OS1.2]
	[F03,F02,F01-OP1.2]
2.4.1.4. Lint Traps for Laundry Equipment	
(1)	[F01-OS1.1]
2.4.2.1. Smoking Areas	
(1)	[F01-OS1.1]
(3)	[F01-OS1.1]
2.4.2.2. Signs	
(1)	[F01-OS1.1]
2.4.3.1. Open Flames in Processions	
(1)	[F01-OS1.1]
2.4.3.2. Flaming Meals and Drinks	
(1)	[F01-OS1.1]
(2)	[F01-OS1.1]
(3)	[F01-OS1.1]
(4)	[F12,F02-OS1.2]
	[F12,F02-OP1.2]
2.4.3.3. Devices Having Open Flames	
(1)	[F01-OS1.1]
2.4.4.1. Flammable and Combustible Liquids	
(2)	[F01-OS1.1]
2.4.4.2. Flammable Gases	
(1)	[F01-OS1.1]
2.4.5.1. Open Air Fires	
(1)	[F01,F03,F02-OP1.2]
	[F01,F03,F02-OS1.2]
2.4.6.1. Security	
(1)	[F34-OS1.1,OS1.2]
	[F34-OP3.1]

Table 3.4.1.1.
Objectives and Functional Statements Attributed to the Acceptable Solutions in Part 3
Forming part of Sentence 3.4.1.1.(1)

Acceptable Solutions	Functional Statements and Objectives[1]
(4)	[F81,F43,F12-OS3.4]
	[F81,F12-OH5]
	[F81,F01,F12-OS1.1]
(8)	[F01-OP1.2]
	[F01-OS1.2]
(9)	[F81,F82-OS3.4]
	[F81,F82-OS1.1] [F10-OS1.5]
3.2.7.6. Separation from Other Dangerous Goods	
(1)	[F43-OS3.4]
	[F01-OS1.1]
(2)	[F43-OS3.4]
	[F01-OS1.1]
(3)	[F02-OS1.1,OS3.4]
3.2.7.7. Corrosion Protection	
(1)	[F80-OS3.4]
	[F80-OH5]
	[F80-OS1.1]
3.2.7.8. Flooring Materials	
(1)	(b) [F01-OS1.1]
(2)	[F01-OS1.1]
3.2.7.9. Fire Suppression Systems	
(1)	[F02-OP1.2]
	[F02-OS1.2]
(2)	[F02,F03-OP1.2] [F01-OP1.1]
	[F02,F03-OS1.2] [F01-OS1.1]
3.2.7.10. Smoke Venting	
(1)	[F12,F02-OP1.2]
	[F12,F02-OS1.2,OS1.5]
3.2.7.11. Spill Control	
(2)	(a) [F43-OS3.4]
	(a) [F01-OS1.1]
3.2.7.12. Fire Department Access	
(2)	[F12-OP1.2]
	[F12-OS1.2]
(3)	[F12-OP1.2]
	[F12-OS1.2]
3.2.7.13. Labels	
(1)	[F12,F81-OS3.4]
	[F12-OS1.1,OS1.2] [F81-OS1.1]

Table 3.4.1.1.
Objectives and Functional Statements Attributed to the Acceptable Solutions in Part 3
Forming part of Sentence 3.4.1.1.(1)

Acceptable Solutions	Functional Statements and Objectives[1]
3.2.7.14. Placards	
(1)	[F12,F81-OS3.4]
	[F12-OS1.1,OS1.2] [F81-OS1.1]
(2)	[F12-OS3.4]
	[F12-OS1.2]
(3)	[F12-OS3.4]
	[F12-OS1.2]
(4)	[F12-OS3.4]
	[F12-OS1.2]
3.2.7.15. Training	
(1)	(c) [F12-OS1.1,OS1.2] [F81-OS1.1]
	(b) [F12-OS1.1,OS1.2] [F81-OS1.1]
	(b) [F12,F81-OS3.4]
	(c) [F12-OS3.4]
(2)	[F81-OS3.4]
	[F81-OS1.1]
(3)	[F81,F12-OS3.4]
	[F81,F12-OS1.1]
3.2.7.16. Unauthorized Access	
(1)	[F34-OH5]
	[F34-OS3.4]
	[F34-OS1.1]
3.2.7.17. Separation from Combustible Products	
(1)	[F03-OS1.2] [F01-OS1.1]
3.2.7.18. Storage of Oxidizers in Mercantile Occupancies	
(2)	[F03-OS1.2] [F01-OS1.1]
(3)	[F03-OS1.2] [F01-OS1.1]
3.2.8.2. Flammable Gases	
(1)	(b) [F12-OS1.2] [F01-OS1.1] [F02-OS1.3]
	(d) [F02-OS1.3]
	(f) [F01-OS1.1]
	(b) [F02-OP1.3]
	(g) [F01,F02-OS1.1]
(2)	(a) [F01-OS1.1]
	(b) [F01-OS1.1] [F02-OS1.2]
(3)	[F01,F02,F03,F81-OS1.1,OS1.2]
3.2.8.3. Indoor Storage of Poisonous, Corrosive or Oxidizing Gases	
(1)	(d) [F44-OS1.2,OS1.5,OS1.1]
	(b) [F12-OS1.2] [F01-OS1.1]
(2)	[F01,F02-OS1.1,OS1.2,OS1.5]

4.3.8.4. Damage Repair

1) Underground *storage tanks* that are in the process of being installed shall be inspected, and any damage to the tank shell, protective coating, fittings or anodes shall be repaired before they are lowered into the excavation.

2) Damage to *storage tank* shells shall not be repaired on site.

4.3.8.5. Damage Prevention

1) Underground *storage tanks* shall be lowered into the excavation by the use of lifting lugs and hooks and, where necessary, spreader bars to prevent damage to the tank shell, protective coating, fittings or anodes.

2) Any method of handling that might result in damage to the protective coating of the tank shall not be used.

4.3.8.6. Installation

1) Underground steel *storage tanks* shall be installed in conformance with Appendix A of CAN/ULC-S603.1, "External Corrosion Protection Systems for Steel Underground Tanks for Flammable and Combustible Liquids."

2) Underground reinforced plastic *storage tanks* shall be installed in conformance with Appendix A of ULC-S615, "Reinforced Plastic Underground Tanks for Flammable and Combustible Liquids."

3) Underground *storage tanks* shall not be placed in direct contact with reinforced concrete slabs but shall be separated by not less than 150 mm of sand or other suitable material to evenly distribute the weight of the tank on the supporting base.

4.3.8.7. Filling

1) *Flammable liquids* or *combustible liquids* shall not be placed in an underground *storage tank* until

a) the fill pipe and vent line have been installed in the tank, and

b) all other openings have been sealed.

4.3.8.8. Spillage

1) If a spillage occurs, the escaped liquid and all soil contaminated by the spill shall be removed in conformance with Subsection 4.1.6.

4.3.8.9. Anchorage

1) Underground *storage tanks* shall be protected against hydrostatic forces which can cause the uplift of the tanks once they are empty. (See Appendix A.)

2) Where anchors and ground straps are used to resist the uplift forces referred to in Sentence (1), they shall be

a) electrically isolated from the tank, and

b) installed in such a manner that they do not damage the tank's shell, protective coating, fittings or anodes.

4.3.9. Sumps

4.3.9.1. <Installation

1) A *dispenser sump* shall be provided under a dispenser, unless the dispenser is located on top of an aboveground *storage tank*.

2) A *spill containment sump* shall be provided at every underground *storage tank* fill point.

3) A *transition sump* shall be provided for all mechanical pipe connections located below *grade*.

4) A *turbine sump* shall be provided for all turbine pump assemblies located below *grade* or above *grade* where they are not readily visible.

5) In addition to the requirements of Article 4.3.9.2., the sumps referred to in Sentences (1) to (4) shall be installed in conformance with the sump manufacturer's instructions.>

4.3.9.2. Construction

1) *Dispenser sumps* shall conform to the construction and performance requirements of ULC/ORD-C107.21, "Under-Dispenser Sumps."

2) *Spill containment sumps* shall conform to the construction and performance requirements of ULC/ORD-C58.19, "Spill Containment Devices for Underground Flammable Liquid Storage Tanks."

4.3.9.3. Leak Detection Monitoring

1) Where *dispenser sumps*, *turbine sumps* and *transition sumps* referred to in Article 4.3.9.1. are used in underground applications, they shall be provided with an electronic monitoring device to indicate the presence of liquid.

4.3.10. Corrosion Protection of Underground Steel Storage Tanks

4.3.10.1. Corrosion Protection

1) Underground steel *storage tanks* and <integral fittings> subject to corrosion shall be

a) protected in conformance with CAN/ULC-S603.1, "External Corrosion Protection Systems for Steel Underground Tanks for Flammable and Combustible Liquids," or

b) <protected by impressed current in conformance with NACE RP0285, "Corrosion Control of Underground Storage Tank Systems by Cathodic Protection.">

4.3.11. Vents for Underground Storage Tanks

4.3.11.1. Vent Design

1) Underground *storage tanks* shall be provided with vent openings and piping of sufficient cross-sectional area designed to vent the tanks during the maximum filling or withdrawal rate without causing the allowable stress for the tank to be exceeded.

4.3.11.2. Materials and Construction

1) Except at *distilleries* covered in Section 4.10., vent piping materials and construction shall conform to Subsections 4.5.2., 4.5.3. and 4.5.5.

4.3.11.3. Installation

1) Vent pipe outlets from underground *storage tanks* for Class I liquids

a) shall be located outside *buildings* higher than the fill pipe openings but not less than

i) 3.5 m above the adjacent ground level,

ii) 1.5 m from any *building* opening, and

iii) 7.5 m from any dispenser, and

b) shall discharge so that flammable vapours will not enter *building* openings or be trapped near any part of the *building*.

2) Vent pipe outlets from underground *storage tanks* for Class II or IIIA liquids shall be located outside *buildings* at a height that is above the fill pipe opening but not less than 2 m above finished ground level.

3) Vent pipes from underground *storage tanks* for *flammable liquids* or *combustible liquids* shall not be obstructed by any device that may cause excessive back pressure, except that vent pipes from underground *storage tanks* for Class II or IIIA liquids are permitted to be fitted with return bends, coarse screens or other devices to minimize the entry of foreign material.

4) Vent piping shall enter the *storage tank* through the top of the tank and shall not extend into the tank more than 25 mm.

5) Vent piping shall be

a) installed so that any nominally horizontal run shall slope towards the *storage tank*,

b) constructed without traps,

c) adequately supported to prevent sagging, and

d) where necessary, protected against mechanical damage.

6) <Vent piping shall be tested for leaks at the commissioning stage in conformance with Clause 4.4.1.2.(1)(a).>

4.3.11.4. Interconnection of Vent Pipes

1) Except as permitted in Sentence (2), where vent piping connects 2 or more *storage tanks*, pipe sizes shall be designed to vent the combined vapours produced in the connected underground *storage tanks* without exceeding the allowable stresses of the tanks when being filled simultaneously.

2) Where it is not possible to fill the connected *storage tanks* referred to in Sentence (1) simultaneously, or where the connected vents have a vapour recovery system, the vent piping shall be sized to accommodate the maximum vapour flow possible in the system.

3) Vent piping for an underground *storage tank* containing a Class I liquid shall not be connected to the vent piping for a *storage tank* containing a Class II or IIIA liquid unless an effective method is provided to prevent the vapours from the Class I liquid *storage tank* from entering the other tank.

Section 4.4 Leak Detection of Storage Tanks and Piping Systems

4.4.1. General

4.4.1.1. Application

1) Except as provided in Sentence (2) and except as otherwise specified in this Code, this Section provides the minimum requirements regarding the detection of leaks in aboveground and underground *storage tanks*, piping systems and sumps.

2) This Section shall not apply to *storage tanks* that have been taken out of service in compliance with the applicable provisions of Subsection 4.3.16.

4.4.1.2. Frequency and Methods of Leak Detection Testing and Monitoring

1) Every *storage tank*, piping system and sump, including those at *fuel-dispensing stations*, shall be tested and monitored for leaks in conformance with Tables 4.4.1.2.A to 4.4.1.2.E, which establish the minimum requirements regarding the frequency and methods to be used for

a) commissioning testing,

b) subsequent in-service monitoring, and

c) testing when a leak is suspected.

<(See Appendix A.)>

2) The methods referred to in Sentence (1) shall conform to Subsections 4.4.2. to 4.4.4.

3) The commissioning testing referred to in Sentence (1) shall be performed at the time of installation

a) once backfill and surfacing have been completed but before being put into service, in the case of an underground *storage tank* or underground piping system,

b) before being put into service, in the case of an aboveground *storage tank* or exposed piping system, and

c) once the final surface materials have been installed but before being put into service, in the case of a sump.

4) The frequency of the in-service monitoring referred to in Sentence (1) shall be calculated from the date of the commissioning test.

5) Immediate action shall be taken when a leak is suspected and the leak detection testing referred to in Sentence (1) shall be performed if

a) a loss of liquid or a gain of water is indicated by any of the leak detection measures described in this Section, or

b) the level of water at the bottom of an underground *storage tank* exceeds 50 mm.

6) <Where *dispenser sumps*, *transition sumps* and *turbine sumps* are provided with electronic monitoring devices in accordance with Sentence 4.3.9.3.(1), the devices shall be interlocked with the dispenser or pump to shut it down upon detection of either product or a high liquid level.>

7) The minimum requirements referred to in Sentence (1) shall not preclude the appropriate use of alternative solutions, innovative new technologies, or methods capable of achieving the same objectives. (See Appendix A.)

Table 4.4.1.2.A
Leak Detection Testing and Monitoring of Underground Storage Tanks
Forming part of Sentences 4.4.1.2.(1) and 4.4.2.1.(5)

Type of Containment	Commissioning Test	In-Service Monitoring		Leak Suspected
		Continuous	Periodic	
Single-walled(1)	N/A(2)	Inventory Reconciliation	Precision Leak Detection Test every 2 years	Precision Leak Detection Test
		Inventory Reconciliation and Monitoring Wells	Precision Leak Detection Test every 5 years	
		Statistical Inventory Reconciliation (SIR)		
		Automatic Tank Gauge	None required	
		Continuous In-Tank Leak Detection		
Double-walled(3)	Precision Leak Detection Test or Secondary Containment Test(4)	Secondary Containment Monitoring	None required	Precision Leak Detection Test or Secondary Containment Test(4)

Notes to Table 4.4.1.2.A:
(1) Applies to single-walled *storage tanks* of typical construction, including *storage tanks* that do not meet the requirements for double-walled *storage tanks*.
(2) <Not applicable because underground *storage tanks* must be of double-walled construction as per Sentence 4.3.8.1.(1).>
(3) Applies to double-walled *storage tanks*, which have an interstitial space that allows for monitoring using high- or low-tech methods.
(4) The Secondary Containment Test is a <precision test> capable of detecting leaks in the interstitial space of the *storage tank*. Risers, connections and vents are also susceptible to leakage and must therefore also be precision-tested.

Table 4.4.1.2.B
Leak Detection Testing and Monitoring of Aboveground Storage Tanks
Forming part of Sentence 4.4.1.2.(1)

Type of Containment(1)	Commissioning Test	In-Service Monitoring		Leak Suspected
		Continuous	Periodic	
Contained open(2)vertical tank	Visual inspection(3) during Liquid Media Test	Inventory Reconciliation and Secondary Containment Monitoring	API 653 or Tank floor inspection every 10 years	API 653 or Tank floor inspection
Contained open(2) horizontal tank	Visual inspection(3) during Liquid Media Test		None required	Visual inspection(3)
Double-walled(4)	Visual inspection(3)	Secondary Containment Monitoring	None required	Secondary Containment <Test>

Notes to Table 4.4.1.2.B:
(1) See Subsection 4.3.7.
(2) Applies to *storage tanks* contained in an open arrangement that do not meet the requirements for double-walled *storage tanks* and do not conform to Subsection 4.3.7.
(3) Visual leak detection may apply to single- or double-walled *storage tanks* and piping. See Sentence 4.4.2.1.(8).
(4) Applies to double-walled *storage tanks*, which have an interstitial space that allows for monitoring using high- or low-tech methods.

4.5.4. Identification of Piping Systems

4.5.4.1. Identification

1) Pipelines for *flammable liquids* or *combustible liquids* shall be marked with the contents of the line, and these markings shall be maintained in a clearly legible form.

2) Piping for *flammable liquids* or *combustible liquids* shall not be painted red.

3) Transfer points in piping systems for *flammable liquids* and *combustible liquids* shall be identified in conformance with CPPI 1990, "Using the CPPI Colour-Symbol System to Mark Equipment and Vehicles for Product Identification."

4.5.4.2. Documentation

1) Documentation on the piping systems for *flammable liquids* or *combustible liquids*, including the tank and pumping arrangements, shall be made available to the fire department upon request.

2) Documents referred to in Sentence (1) shall be kept at two separate locations so that one copy remains readily available in the event the other is inaccessible due to fire.

4.5.5. Joints in Piping Systems

4.5.5.1. Threaded Joints

1) Threaded joints in piping systems for *flammable liquids* or *combustible liquids* shall be made using joint compound or polytetrafluoroethylene tape conforming to CAN/ULC-S642, "Compounds and Tapes for Threaded Pipe Joints."

4.5.5.2. Welded Piping

1) Welding of piping for *flammable liquids* or *combustible liquids* shall conform to Section 5.2. and to the appropriate provincial or territorial regulations or municipal bylaws, or in the absence of such regulations, to API 1104, "Welding of Pipelines and Related Facilities."

2) Flanged joints for piping shall be provided in welded systems at intervals that will facilitate dismantling and avoid subsequent in-place cutting and welding operations.

4.5.5.3. Flanged Joints

1) Except as permitted in Sentence (2), flanged joints for piping shall be made with forged or cast steel flanges designed, constructed and installed in conformance with ASME B16.5, "Pipe Flanges and Flanged Fittings NPS ½ Through NPS 24 Metric/Inch Standard."

2) Bronze flanges for 50 mm diameter or smaller size piping referred to in Article 4.5.5.2. are permitted to be used where copper and brass piping is permitted.

4.5.5.4. Bolting Materials

1) Bolting materials for flanged connections in steel piping systems for *flammable liquids* or *combustible liquids* shall be of alloy steel equivalent to ASTM A 193/A 193M, "Alloy-Steel and Stainless Steel Bolting Materials for High Temperature or High Pressure Service and Other Special Purpose Applications," Grade B-7.

4.5.5.5. Gaskets

1) Gaskets in flanged connections shall be of a material resistant to the liquid being carried and capable of withstanding temperatures of <at least 650°C without damage that would impair their function.>

4.5.5.6. Mechanical Connections

<(See Appendix A.)>

1) <Mechanical connections in> underground piping systems shall

a) be readily accessible for inspection and maintenance,

b) not be in direct contact with the soil, and

c) <be provided within a *transition sump*.>

4.5.5.7. <Penetrations into Sumps

1) All penetrations into a sump shall be situated at least 50 mm from the bottom of the sump. (See Appendix A.)>

4.5.6. Location and Arrangement of Piping

4.5.6.1. <Construction

1) Except for vent risers and vertical fill piping systems, underground piping systems shall be of double-walled construction.>

4.5.6.2. Location

1) Piping shall be installed outdoors whenever possible and located so it will not create a hazard to *buildings* or equipment.

2) Where piping for *flammable liquids* or *combustible liquids* is installed within a *building*, the length of piping shall be as direct and as short as practicable.

3) It is not permitted to use any portion of a piping system in a manner that could damage it or for any purpose other than the transfer of product.

4) Vent piping and connections for filling and emptying *storage tanks* shall be located in conformance with Section 4.3.

4.5.6.3. Supports for Aboveground Outdoor Piping

1) Aboveground outdoor piping shall be supported and arranged to prevent excessive vibration and stress on equipment connected to it.

2) Where vehicular, watercraft or floatplane impact or physical damage is possible, protective guarding devices shall be provided for aboveground outdoor piping.

3) Aboveground piping systems shall be supported such that they are not in direct contact with the surface of the ground.

4.5.6.4. Arrangement of Aboveground Outdoor Piping

1) Aboveground outdoor piping shall not be located

a) on the exterior of walls except on those of *noncombustible construction*, or

b) above windows.

2) Aboveground outdoor piping shall not be located above roofs except above roofs of impermeable and *noncombustible construction*, with provision for accidental spillage provided in conformance with Subsection 4.1.6.

3) Where aboveground piping crosses roadways or railway sidings, ample overhead clearance and warning signs indicating the clearance height shall be provided.

4) Piping passing though the secondary containment walls of an aboveground *storage tank* shall be designed to prevent excessive stress resulting from settlement or fire exposure.

4.5.6.5. Arrangement of Underground Piping

1) Underground piping shall be located so it will not be damaged as a result of vibrations or settling of an adjacent *building* or structure.

2) Underground piping shall be located not less than 300 mm away from the foundations of any *building* or structure, except where such piping enters the *building* as permitted in Article 4.5.6.8.

3) Piping passing under railway tracks shall be installed in conformance with TC 2001, "Standards Respecting Pipeline Crossings Under Railways."

4) Piping adjacent to railway tracks shall be installed in conformance with TC General Order No. O-32, C.R.C., c1148, "Flammable Liquids Bulk Storage Regulations."

4.5.6.6. Installation of Underground Piping

1) Underground piping shall be

a) supported on

   i) undisturbed or compacted soil, or

   ii) not less than 150 mm of clean sand, pea gravel or clean crushed stone, and

b) backfilled on the top and sides with not less than

   i) 300 mm of pea gravel or clean crushed stone, or

   ii) 300 mm of clean sand, free of cinders and stones, and compacted in layers not more than 300 mm thick.

Table 4.12.1.1.
Objectives and Functional Statements Attributed to the Acceptable Solutions in Part 4
Forming part of Sentence 4.12.1.1.(1)

Acceptable Solutions	Functional Statements and Objectives[1]
4.1.5.5. Emergency Planning	
(2)	[F12-OS1.2]
4.1.5.6. Access for Firefighting	
(1)	[F12-OS1.2]
	[F12-OP1.2]
	[F12-OP3.1]
4.1.5.8. Basement Storage	
(1)	[F43,F01-OS1.1]
(2)	[F02,F43-OS1.1]
4.1.6.1. Spill Control	
(1)	[F44-OS1.1,OS1.2] Applies to preventing spills from flowing outside the spill area.
	[F44-OP1.1,OP1.2] Applies to preventing spills from flowing outside the spill area.
	[F44-OH5]
(3)	[F44-OH5]
	[F44-OS1.1,OS1.2]
(4)	[F44-OP1.1,OP1.2]
	[F44-OS1.1,OS1.2]
	[F44-OH5]
4.1.6.2. Drainage Systems	
(1)	(a) [F44-OH5] Applies to the termination of the drainage system where it will not create a risk to public health.
	[F44-OS1.1,OS1.2,OS1.4]
	[F44-OP1.1,OP1.2]
(2)	[F03-OS1.2]
4.1.6.3. Spills and Leaks	
(1)	[F82,F44-OS1.1,OS1.2]
	[F82,F44-OP1.1,OP1.2]
(2)	[F44-OP1.1,OP1.2]
	[F44-OS1.1,OS1.2]
	[F44-OH5]
(3)	(a) [F01,F02-OS1.1] (b) [F02-OS1.1,OS1.2]
	(a) [F44-OP1.1,OP1.2] (b) [F02-OP1.1,OP1.2]
4.1.7.1. Rooms or Enclosed Spaces	
(1)	[F01-OS1.1] Applies to conformance to the appropriate provincial or territorial regulations or municipal bylaws.
	[F01-OS1.1] Applies to portion of Code text: "… shall conform … to this Part, and the BCBC."
4.1.7.2. Ventilation Measures	
(1)	[F01-OS1.1]
(2)	[F43-OS1.1]
(3)	[F01-OS1.1]

Table 4.12.1.1.
Objectives and Functional Statements Attributed to the Acceptable Solutions in Part 4
Forming part of Sentence 4.12.1.1.(1)

Acceptable Solutions	Functional Statements and Objectives[1]
(4)	[F01-OS1.1]
	[F01-OP1.1]
(5)	(a) [F01-OS1.1]
	(b) [F11-OS1.1]
	(c) [F01,F02-OS1.1,OS1.2]
	(c) [F02-OP1.2]
4.1.7.3. Location of Air Inlets and Outlets	
(1)	[F01-OS1.1]
(3)	[F01-OS1.1]
(4)	[F01-OS1.1]
4.1.7.4. Location of Mechanical Ventilation Exhaust Air Outlets	
(1)	(a) [F01-OS1.1]
	(b) [F03-OP1.2]
	(b) [F03-OP3.1]
	(b) [F01-OS1.1] [F03-OS1.2]
4.1.7.5. Make-up Air	
(1)	[F01-OS1.1]
(2)	[F01,F44-OS1.2]
(3)	[F03-OS1.2]
	[F03-OP1.2]
4.1.7.6. Recirculating Ventilation Systems	
(1)	[F01-OS1.1]
	(a),(b)(i) [F11,F01-OS1.1]
4.1.7.7. Exclusive Use of Ducts	
(1)	[F01,F44-OS1.1,OS1.2] [F03-OS1.2]
	[F01,F44-OP1.1,OP1.2] [F03-OP1.2]
4.1.7.8. Maintenance	
(1)	[F82-OS1.1]
4.1.8.1. Containers and Storage Tanks	
(2)	[F43-OS1.1]
(3)	[F43-OS1.1]
4.1.8.2. Control of Static Electric Charge	
(1)	(b) [F01-OS1.1]
	[F01-OS1.1]
(2)	[F01-OS1.1]
(4)	[F22-OS1.1]
4.1.8.3. Transfer	
(1)	(b) [F43-OS1.1]
	(c) [F43-OS1.1]
(2)	[F20,F81,F01-OS1.1]

Table 4.12.1.1.
Objectives and Functional Statements Attributed to the Acceptable Solutions in Part 4
Forming part of Sentence 4.12.1.1.(1)

Acceptable Solutions	Functional Statements and Objectives[1]
4.2.7.3. Fire Compartments	
(1)	[F03-OS1.2]
	[F03-OP1.2]
4.2.7.4. Dispensing and Transfer	
(1)	[F01,F02,F03-OS1.2]
	[F01,F02,F03-OP1.2]
(2)	[F02,F01-OS1.2,OS1.1]
	[F01,F02-OP1.1,OP1.2]
4.2.7.5. Maximum Quantities	
(1)	[F03,F02-OS1.2]
	[F43,F01-OS1.1]
	[F20-OS1.1,OS1.2] [F04-OS1.2,OS1.5]
	[F04-OP1.2]
	[F20-OH5]
	[F03,F02-OP1.2]
(2)	[F03-OS1.2]
	[F03-OP1.2]
4.2.7.6. Fire Suppression Systems	
(1)	[F02-OS1.2]
	[F02-OP1.1]
4.2.7.7. Clearances	
(1)	[F04-OS1.3]
	[F04-OP1.3]
(2)	[F02-OS1.2]
	[F02-OP1.2]
(3)	[F81,F82-OS1.1] [F10-OS1.5]
4.2.7.10. Separation from Combustible Products	
(1)	[F03-OS1.2]
4.2.8.2. Maximum Quantities	
(1)	[F02-OS1.2]
	[F02-OP1.2]
(2)	[F02-OS1.2]
	[F02-OP1.2]
(3)	[F02-OS1.2]
	[F02-OP1.2]
4.2.8.3. Handling	
(1)	[F01-OS1.1]

Table 4.12.1.1.
Objectives and Functional Statements Attributed to the Acceptable Solutions in Part 4
Forming part of Sentence 4.12.1.1.(1)

Acceptable Solutions	Functional Statements and Objectives[1]
4.2.8.4. General Storage Areas	
(1)	[F02,F03-OS1.2]
	[F02,F03-OP1.2]
(4)	[F02-OS1.2]
	[F02-OP1.2]
4.2.9.1. Maximum Quantities	
(1)	[F02-OS1.2] Applies to storage densities averaged over the total room area.
	[F02-OS1.2] Applies to the total quantities of *flammable liquids* and *combustible liquids*.
	[F03-OS1.2] Applies to the *fire-resistance ratings* of *fire separations*.
	[F02-OP1.2] Applies to storage densities averaged over the total room area.
	[F02-OP1.2] Applies to the total quantities of *flammable liquids* and *combustible liquids*.
	[F03-OP1.2] Applies to the *fire-resistance ratings* of *fire separations*.
(2)	[F02-OS1.2]
	[F02-OP1.2]
4.2.9.2. Spill Control	
(1)	[F44-OS1.1,OS1.2]
	[F44-OP1.2]
	[F44-OH5]
4.2.9.3. Aisles	
(1)	[F81,F82-OS1.1,OS1.2] [F12-OS1.2] [F10-OS1.5]
	[F12-OP1.2]
4.2.9.4. Dispensing	
(1)	[F43,F01-OS1.1]
4.2.10.1. Containers	
(1)	[F43,F01-OS1.1] Applies to storage in *closed containers*.
4.2.10.2. Maximum Quantity per Cabinet	
(1)	[F02-OS1.2]
	[F02-OP1.2]
4.2.10.3. Maximum Quantity per Fire Compartment	
(1)	[F02-OS1.2]
	[F02-OP1.2]
(2)	[F02-OS1.2]
	[F02-OP1.2]
(3)	[F02-OS1.2]
	[F02-OP1.2]
4.2.10.4. Labelling	
(1)	[F01-OS1.1]

Table 4.12.1.1.
Objectives and Functional Statements Attributed to the Acceptable Solutions in Part 4
Forming part of Sentence 4.12.1.1.(1)

Acceptable Solutions	Functional Statements and Objectives[1]
4.2.10.5. Fire Endurance	
(1)	[F01-OS1.1]
	[F44-OS1.1]
	[F03-OS1.2]
	[F03-OP1.2]
	[F44-OP1.1]
	[F44-OH5]
4.2.10.6. Ventilation	
(1)	(a) [F01-OS1.1,OS1.2] Applies to materials providing equivalent fire protection. (b) [F01-OS1.1,OS1.2] Applies to the vent piping providing equivalent fire protection.
	(a) [F01-OS1.1] Applies to portion of Code text: "… the ventilation openings shall be sealed …" (b) [F01-OS1.1] Applies to portion of Code text:"… the cabinet shall be vented outdoors …"
4.2.11.1. Quantities and Clearances	
(1)	[F03,F02-OS1.2]
	[F03,F02-OP3.1]
(2)	(a),(b) [F03,F02-OS1.2]
	(a),(b) [F03,F02-OP3.1]
4.2.11.3. Fire Department Access	
(1)	[F12-OP3.1]
4.3.1.2. Atmospheric Storage Tanks	
(1)	[F20,F80,F43,F81,F01-OS1.1]
	[F20,F80,F43,F81-OH5]
(4)	[F01,F20,F81-OS1.1]
	[F20,F81-OH5]
4.3.1.3. Low Pressure Storage Tanks and Pressure Vessels	
(1)	[F43,F80,F81,F20,F01-OS1.1]
	[F43,F80,F81,F20-OH5]
(2)	[F81,F80,F43,F01,F20-OS1.1]
	[F43,F81,F80,F20-OH5]
4.3.1.4. Operating Pressure	
(1)	[F81,F20-OS1.1]
	[F81,F20-OH5]
4.3.1.5. Corrosion Protection	
(1)	[F80-OS1.1]
	[F80-OH5]
4.3.1.6. Floating Roofs	
(1)	[F04-OS1.1]
4.3.1.7. Identification	
(1)	[F81-OS1.1] [F12-OS1.2]
	[F12-OP1.2]

Table 4.12.1.1.
Objectives and Functional Statements Attributed to the Acceptable Solutions in Part 4
Forming part of Sentence 4.12.1.1.(1)

Acceptable Solutions	Functional Statements and Objectives[1]
4.3.1.8. Overfill Protection	
(1)	[F43-OS1.1]
	[F43-OH5]
	[F43-OP1.1]
(2)	[F43-OS1.1]
	[F43-OH5]
	[F43-OP1.1]
4.3.1.9. Installation and Use	
(1)	[F81,F80,F43,F01,F20-OS1.1]
	[F81,F80,F43,F01,F20-OH5]
4.3.1.10. Reuse	
(2)	[F20,F43,F01-OS1.1]
	[F20,F43-OH5]
(3)	[F20,F43,F01-OS1.1]
	[F20,F43-OH5]
(4)	[F81-OH5]
	[F81-OS1.1]
4.3.2.1. Location	
(2)	[F03-OP3.1]
	[F03-OS1.2]
(3)	[F03-OP3.1]
	[F03-OS1.2]
(4)	[F03-OP3.1]
	[F03-OS1.2]
(5)	[F03-OP3.1]
	[F03-OS1.2]
(6)	(a) [F03-OP3.1]
	(b) [F01,F02-OP3.1]
	(a) [F03-OS1.2]
	(b) [F01,F02-OS1.2]
(7)	[F04,F02-OP3.1]
	[F04,F02-OS1.2]
(8)	[F02-OP3.1]
4.3.2.2. Spacing between Storage Tanks	
(1)	[F03,F12-OP1.2] Applies to the minimum distance being 0.25 times the sum of the tanks' diameters.
	[F82-OS1.1] Applies to the minimum distance of 1 m between the *storage tanks*.
	[F82-OP1.2] Applies to the minimum distance of 1 m between the *storage tanks*.
	[F82-OH5] Applies to the minimum distance of 1 m between the *storage tanks*.
(2)	[F03-OP1.2]
(3)	[F03-OP1.2]
4.3.2.3. Clearances from Liquefied Petroleum Gas Cylinders and Tanks	
(1)	[F03-OP1.2]
(2)	[F02,F03-OP1.2]

Table 4.12.1.1.
Objectives and Functional Statements Attributed to the Acceptable Solutions in Part 4
Forming part of Sentence 4.12.1.1.(1)

Acceptable Solutions	Functional Statements and Objectives[1]
4.3.2.4. Fire Department Access	
(1)	[F12-OP1.2]
(2)	[F12-OP1.2]
(3)	[F02,F03-OP1.2]
4.3.2.5. Fire Protection Systems	
(2)	[F02,F03-OP1.2]
	[F02-OS1.2]
4.3.3.1. Foundations and Supports	
(1)	[F02-OS1.2] Applies to the requirement that *storage tanks* rest on the ground or on foundations, supports or piling made of concrete, masonry or steel.
	[F22,F81,F20-OS1.1]
	[F22,F81,F20-OH5]
(2)	[F22-OS1.1] Applies to the installation of tank supports on firm foundations designed to minimize uneven settling of the tank.
	[F80-OS1.1] Applies to the minimizing of corrosion of the part of the tank resting on the foundation.
	[F22-OH5] Applies to the installation of tank supports on firm foundations designed to minimize uneven settling of the tank.
	[F80-OH5] Applies to the installation of tank supports on firm foundations designed to minimize corrosion of the part of the tank resting on the foundation.
(3)	[F04-OS1.2]
(4)	[F20,F81-OS1.1]
	[F20,F81-OH5]
4.3.3.2. Earthquake Protection	
(1)	[F22-OS1.1]
	[F22-OH5]
4.3.3.3. Protection against Flooding	
(1)	[F22-OS1.1]
	[F22-OH5]
4.3.4.1. Design and Installation	
(1)	[F20,F81-OS1.1] Applies to the requirement for normal venting.
	[F04,F81-OS1.1] Applies to the requirement for emergency venting.
	[F20,F81-OH5] Applies to the requirement for normal venting.
4.3.4.2. Unstable Liquids	
(1)	[F20,F81,F04-OS1.1]
	[F20,F81,F04-OH5]
4.3.5.2. Location of Vent Pipe Outlets	
(1)	[F01-OS1.1]
(2)	[F01-OS1.1]
(3)	[F01-OS1.1]

Table 4.12.1.1.
Objectives and Functional Statements Attributed to the Acceptable Solutions in Part 4
Forming part of Sentence 4.12.1.1.(1)

Acceptable Solutions	Functional Statements and Objectives[1]
4.3.5.3. Interconnection of Vent Piping	
(1)	[F20,F81-OS1.1]
	[F20,F81-OH5]
(2)	[F01-OS1.1]
4.3.6.1. Provision of Valves	
(1)	[F44-OS1.1]
	[F44-OP1.1]
	[F44-OH5]
(2)	[F44-OS1.1]
	[F44-OP1.1]
	[F44-OH5]
4.3.6.2. Materials	
(1)	[F04,F20-OS1.1] Applies to portion of Code text: "Valves and their connections to a *storage tank* shall be made of steel …"
	[F04,F20-OH5] Applies to portion of Code text: "Valves and their connections to a *storage tank* shall be made of steel …"
(2)	[F20,F04-OS1.1]
	[F20,F04-OH5] Applies to the materials for valves and their connections to a *storage tank* being suitable for the pressures, stresses and temperatures.
4.3.6.3. Openings for Liquid Level Measurements	
(1)	[F43,F01,F81,F34-OS1.1]
	[F43,F81,F34-OH5]
4.3.6.4. Connections for Filling and Emptying	
(1)	(a),(b) [F01-OS1.1]
	(a),(c) [F01-OS1.1]
(2)	[F43,F01,F81,F34-OS1.1]
	[F43,F81,F34-OH5]
(3)	[F01-OS1.1]

Table 4.12.1.1.
Objectives and Functional Statements Attributed to the Acceptable Solutions in Part 4
Forming part of Sentence 4.12.1.1.(1)

Acceptable Solutions	Functional Statements and Objectives[1]
4.3.10.1. Corrosion Protection	
(1)	[F80-OS1.1]
	[F80-OH5]
4.3.11.1. Vent Design	
(1)	[F20,F81-OS1.1]
	[F20,F81-OH5]
4.3.11.3. Installation	
(1)	(a)(i),(b) [F01-OS1.1]
	(a) [F43-OS1.1] Applies to the vent pipe outlets being higher than the fill pipe openings.
	(a)(iii) [F01-OS1.1]
	(a)(ii), (b) [F01-OS1.1]
	(a) [F43-OH5] Applies to the vent pipe outlets being higher than the fill pipe openings.
(2)	[F01-OS1.1] Applies to portion of Code text: "Vent pipe outlets from underground *storage tanks* for Class II or IIIA liquids shall be located outside *buildings* …"
	[F43-OS1.1] Applies to the requirement for vent pipe outlets to be located outside *buildings* at a height that is above the fill pipe opening.
	[F01-OS1.1] Applies to the requirement for vent pipe outlets to be located outside *buildings* at not less than 2 m above finished ground level.
	[F43-OH5] Applies to the requirement for the vent pipe outlets to be located outside *buildings* at a height that is above the fill pipe opening.
(3)	[F20,F81-OS1.1] Applies to the requirement for vent pipes to not be obstructed by any device that may cause excessive back pressure.
	[F20,F81-OH5] Applies to the requirement for vent pipes to not be obstructed by any device that may cause excessive back pressure.
(4)	[F20,F81-OS1.1]
	[F20,F81-OH5]
(5)	(a),(b),(c) [F81,F20-OS1.1]
	(d) [F81-OS1.1]
	(a),(b),(c) [F81,F20-OH5]
	(d) [F81-OH5]
4.3.11.4. Interconnection of Vent Pipes	
(1)	[F20,F81-OS1.1]
	[F20,F81-OH5]
(2)	[F20-OS1.1]
	[F20-OH5]
(3)	[F01-OS1.1]
4.3.12.1. Connections	
(1)	[F43,F01-OS1.1]
	[F43-OH5]

Table 4.12.1.1.
Objectives and Functional Statements Attributed to the Acceptable Solutions in Part 4
Forming part of Sentence 4.12.1.1.(1)

Acceptable Solutions	Functional Statements and Objectives[1]
4.3.12.2. Openings for Measuring Liquid Level	
(1)	[F43,F01,F81,F34-OS1.1]
	[F43,F81,F34-OH5]
4.3.12.3. Fill Piping and Discharge Piping	
(1)	[F43-OS1.1] Applies to portion of Code text: "Fill piping and discharge piping shall enter underground *storage tanks* only through the top of the tank …"
	[F43-OS1.1] Applies to portion of Code text: "… discharge piping used in suction systems shall be sloped toward the *storage tanks*."
	[F43-OH5] Applies to portion of Code text: "Fill piping and discharge piping shall enter underground *storage tanks* only through the top of the tank …"
	[F43-OH5] Applies to portion of Code text: "… discharge piping used in suction systems shall be sloped toward the *storage tanks*".
(2)	[F43-OS1.1]
	[F43-OH5]
(3)	(a),(b) [F01-OS1.1]
	(a),(c) [F01-OS1.1]
(4)	[F43,F01-OS1.1]
	[F43-OH5]
(5)	[F01-OS1.1]
(6)	(a),(c) [F43,F44,F82-OH5]
	(a),(c) [F43,F44,F82-OS3.4]
	(a),(c) [F01,F43,F44,F82-OP1.1]
	(b) [F01,F43-OP1.1]
	(b) [F43-OH5]
(7)	[F01,F43-OS1.1]
	[F01,F43-OS3.4]
	[F01,F43-OH5]
4.3.13.1. Occupancy	
(1)	[F01,F02-OS1.1]
	[F01,F02-OP1.1]
4.3.13.2. Stationary Combustion Engines	
(1)	[F01,F02,F03,F04,F43,F81-OS1.1,OS1.2]
4.3.13.3. Maximum Static Head	
(1)	[F20-OS1.1]
	[F20-OH5]
4.3.13.4. Maximum Quantities and Location	
(1)	(b) [F01-OS1.1] [F02-OS1.2]
	(b) [F01-OP1.1] [F02-OP1.2]

Table 4.12.1.1.
Objectives and Functional Statements Attributed to the Acceptable Solutions in Part 4
Forming part of Sentence 4.12.1.1.(1)

Acceptable Solutions	Functional Statements and Objectives[1]
4.3.13.5. Storage Tank Construction	
(1)	(a) [F01,F20,F43,F80,F81-OS1.1]
	(a) [F01,F20,F43,F80,F81-OP1.1]
	(b) [F01,F43,F82-OS1.1]
	(b) [F01,F43,F82-OP1.1]
	(b) [F20,F43,F80,F81-OH5]
(2)	(b) [F01,F43,F82-OS1.1]
	(b) [F01,F43,F82-OP1.1]
	(b) [F20,F43,F80,F81-OH5]
4.3.13.6. Piping Systems	
(1)	[F01-OS1.1]
	[F01-OP1.1]
4.3.13.7. Fire Compartments	
(1)	[F03-OP1.2]
	[F03-OS1.2]
4.3.13.8. Mixed Storage	
(1)	[F01-OS1.1] [F02-OS1.2]
	[F01-OP1.1] [F02-OP1.2]
4.3.13.9. Storage Tanks outside Storage Rooms	
(1)	(a) [F44-OS1.1]
	(a) [F44-OP1.1]
	(a) [F44-OH5]
	[F01-OS1.1]
4.3.13.10. Vents	
(2)	[F01-OS1.1]
4.3.13.11. Supports, Foundations and Anchorage	
(2)	[F22,F81,F20,F80,F04-OS1.1]
	[F22,F81,F04,F80,F20-OH5]
4.3.13.12. Bonding and Grounding	
(1)	[F01-OS1.1]

Table 4.12.1.1.
Objectives and Functional Statements Attributed to the Acceptable Solutions in Part 4
Forming part of Sentence 4.12.1.1.(1)

Acceptable Solutions	Functional Statements and Objectives[1]
4.3.14.1. Design and Construction	
(1)	(a) [F03-OP1.2]
	(a) [F03-OS1.2]
	(c) [F44-OS1.1,OS1.2]
	(b) [F44-OS1.1] Applies to portion of Code text: "… designed to contain 100% of the volume of the largest *storage tank*…"
	(c) [F44-OH5]
	(c) [F44-OP1.1,OP1.2]
	(b) [F44-OP1.1] Applies to portion of Code text: "… designed to contain 100% of the volume of the largest *storage tank*…"
	(b) [F44-OH5] Applies to portion of Code text: "… designed to contain 100% of the volume of the largest *storage tank*…"
4.3.14.2. Clearances	
(1)	[F82-OS1.1]
	[F82-OH5]
	[F82-OP1.1]
4.3.14.3. Explosion Venting	
(1)	[F02-OS1.3]
	[F02-OP1.3]
	[F02-OP3.1]
4.3.14.4. Hose Stations and Portable Extinguishers	
(1)	[F44-OP1.1]
	[F44-OH5] Applies to portion of Code text: "… shall be provided in the vicinity of the storage room, such that all parts of the room are within reach of a hose stream."
	[F44-OS1.1]
4.3.14.5. Placards	
(1)	[F81-OS1.1] [F12-OS1.2] Applies to the information to be included in the fire safety plan.
	[F12-OS1.2] Applies to the posting of placards in a conspicuous location outside of the room.
	[F12-OP1.2] Applies to the posting of placards in a conspicuous location outside of the room.
	[F81-OP1.1] [F12-OP1.2] Applies to the information being included in the fire safety plan.
4.3.15.1. Connections	
(1)	[F43,F01-OS1.1]
	[F43-OH5]
(2)	[F44-OS1.1]
	[F44-OH5]
	[F44-OP1.1]
4.3.15.2. Openings for Liquid Level Measurement	
(1)	[F43,F01,F81,F34-OS1.1]
	[F43,F81-OH5]
(2)	[F20,F81-OS1.1]
	[F20,F81-OH5]