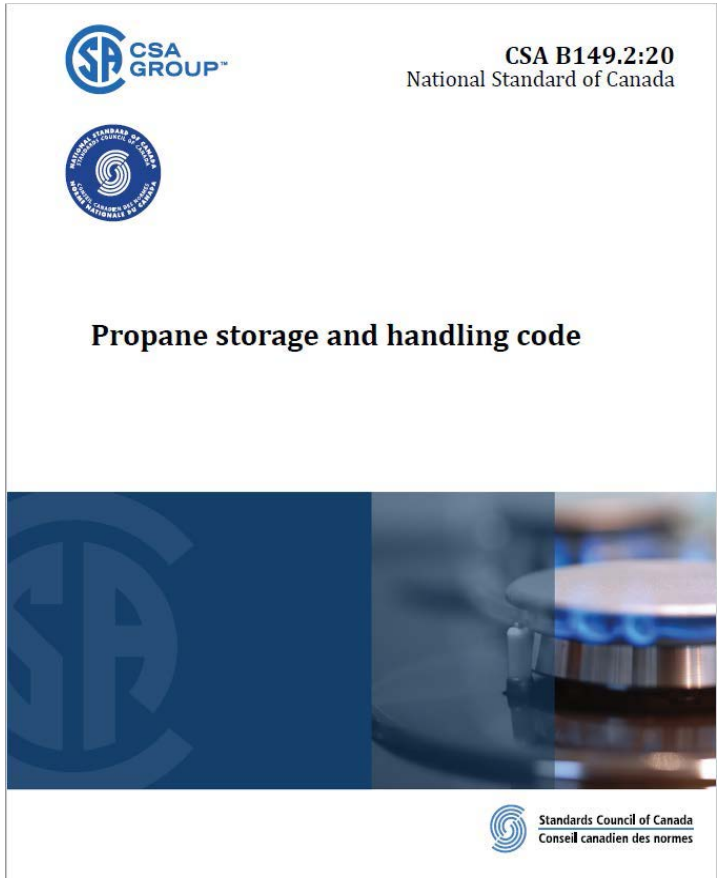
TSASK

TECHNICAL SAFETY AUTHORITY OF SASKATCHEWAN

GAS INSPECTIONS

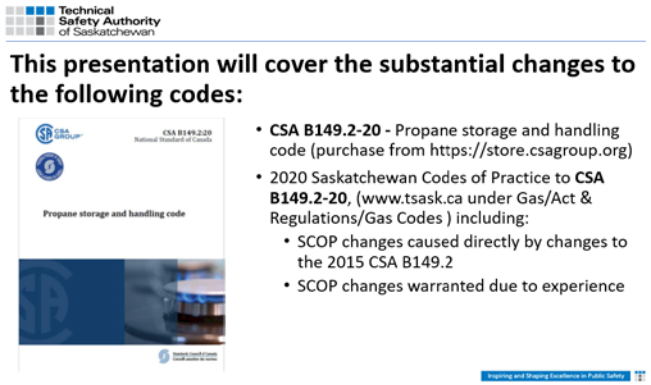
2020 Gas Contractor Presentation
CSA B149.2-20

This presentation will cover the substantial changes to the following codes:

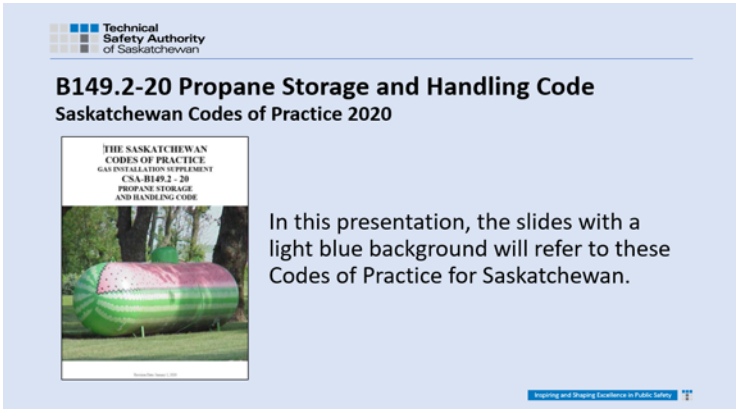


- **CSA B149.2-20 -** Propane storage and handling code (purchase from https://store.csagroup.org)
- 2020 Saskatchewan Codes of Practice to **CSA B149.2-20**, (www.tsask.ca under Gas/Act & Regulations/Gas Codes) including:
  - SCOP changes caused directly by changes to the 2015 CSA B149.2
  - SCOP changes warranted due to experience

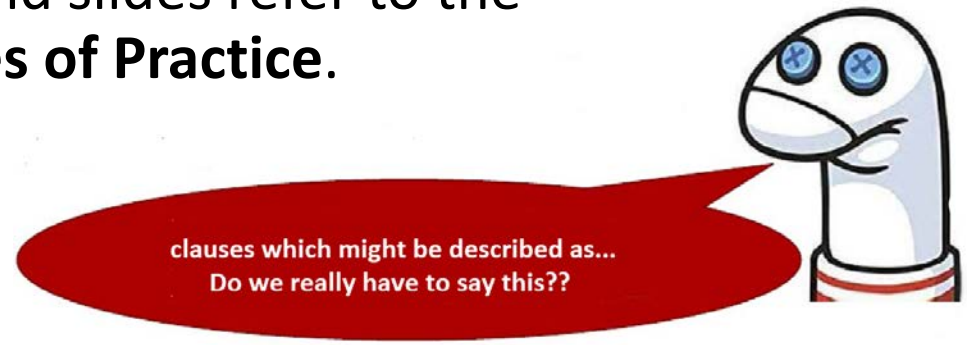
B149.2-20 Propane Storage and Handling Code Color Coding in this Presentation



- White background slides refer to the **National Codes**.

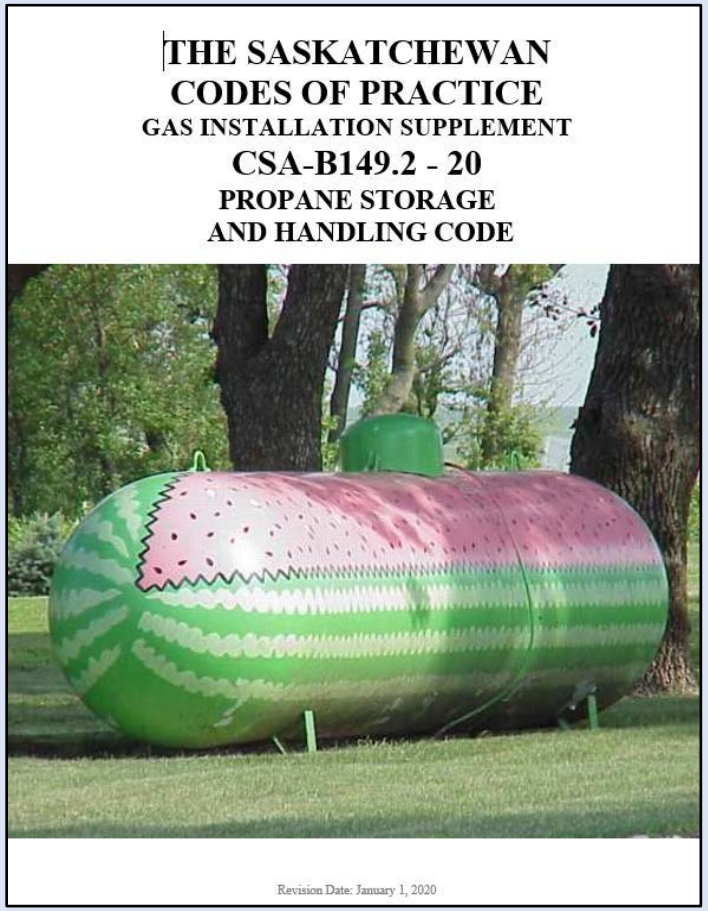


- Light blue background slides refer to the **Saskatchewan Codes of Practice**.



B149.2-20 Propane Storage and Handling Code

Saskatchewan Codes of Practice 2020



In this presentation, the slides with a light blue background will refer to these Codes of Practice for Saskatchewan.

What are the Saskatchewan Codes of Practice?

- Collection of requirements and interpretations that are unique to Saskatchewan.
- Formed by:
  - amending clauses in the national code;
  - adding wording, illustrations or charts to clarify national code requirements; or
  - adding new clauses addressing specific issues unique to the Saskatchewan environment.

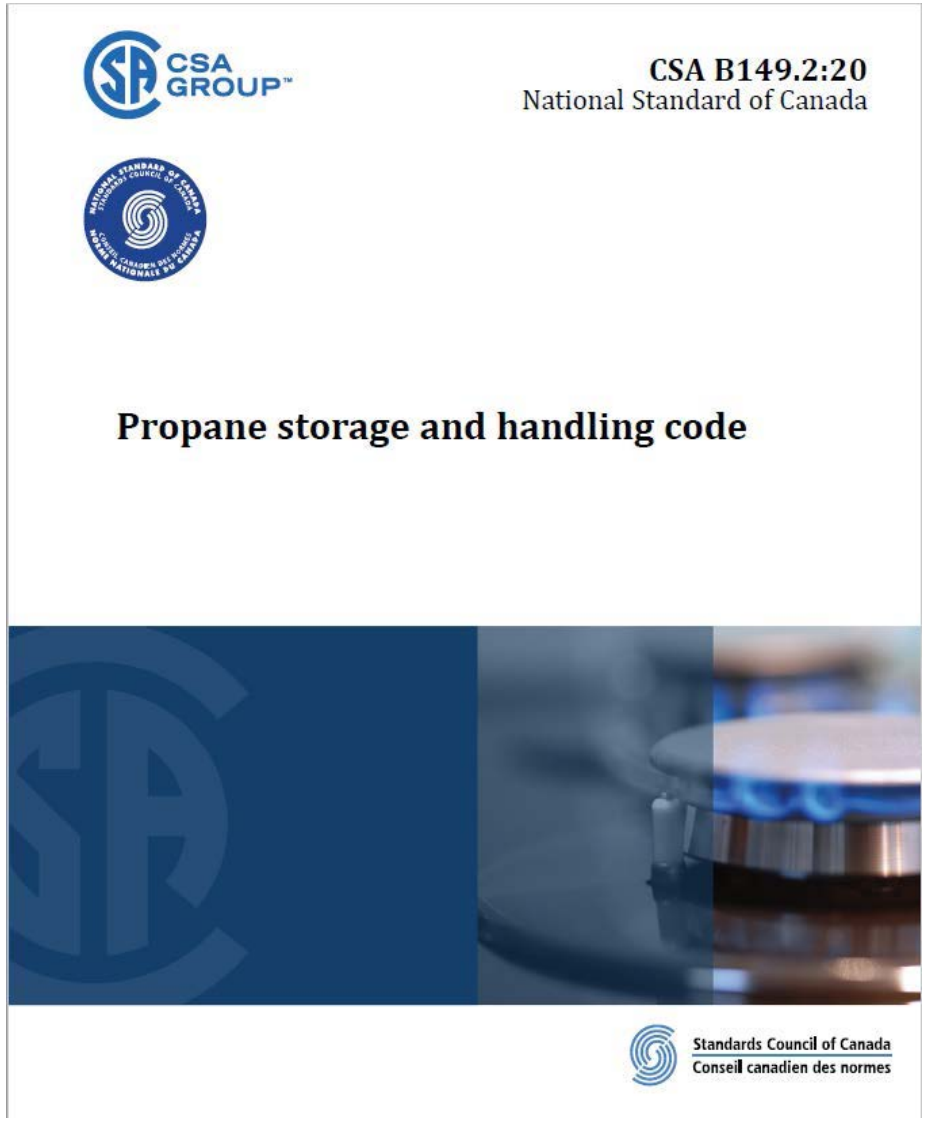
Scope of this Presentation

2020 CSA code overview

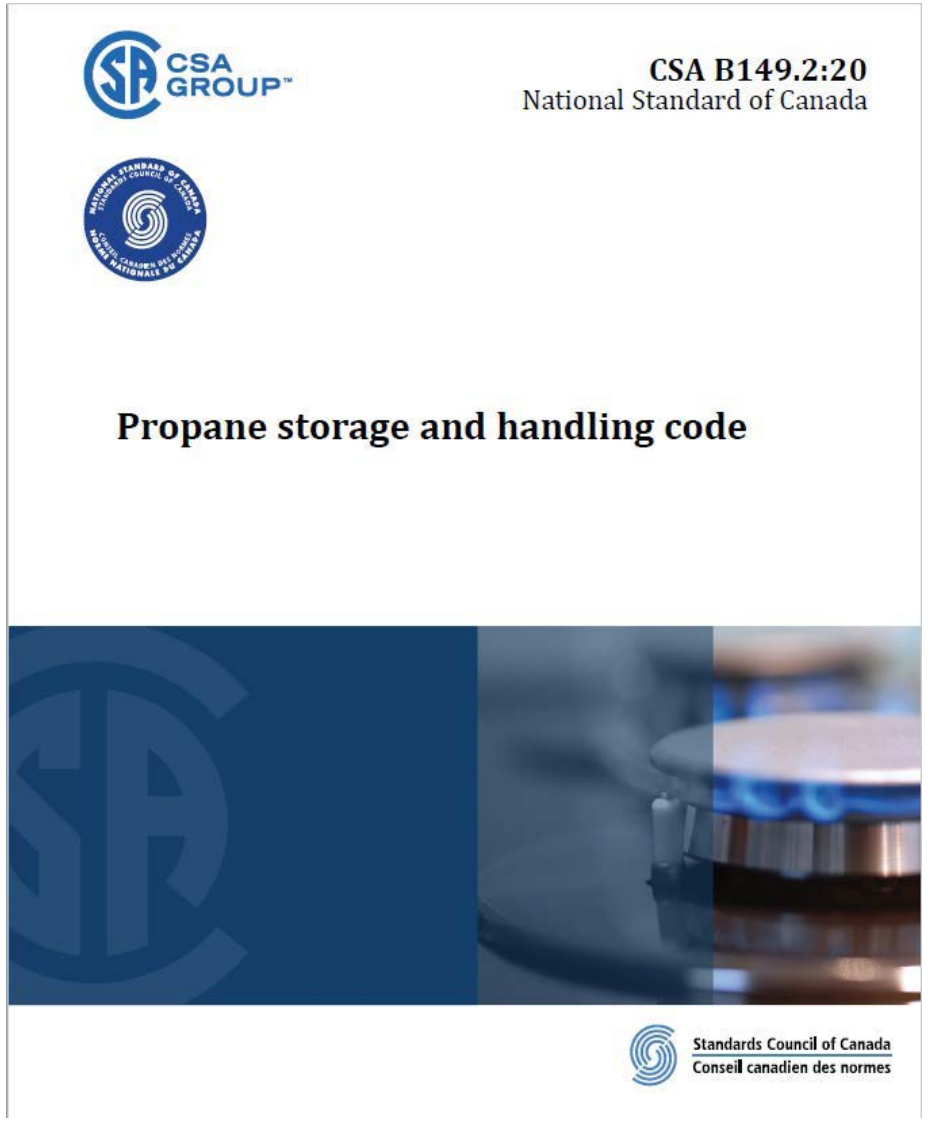
- **The Δ Delta Symbol (previously used to identify changes in the CSA codes) is no longer used by CSA.**
- We will only be covering those clauses having a substantial **technical change**.
- We will cover only the **technical changes** to the Saskatchewan Codes of Practice.
- These codes will be enforced on all permits received **May 1, 2021 & after.**

Scope of this Presentation

- The items addressed in this presentation are only to identify substantial **technical** changes to the Canadian Codes and the Saskatchewan Codes Of Practice.
- For example –B149.2 continues to specify requirements in English units (with metric for reference only). For 2020, Table 7.6 -Electrical Classification, now lists all clearances in metric (as governed by the Canadian Electrical Code) with English units in brackets for reference. We will not be covering every change made to Table 7.6 since the requirements to meet the Canadian Electrical Code have not changed.
- **You are strongly encouraged to review the 2020 Code and Saskatchewan Codes of Practice in their entirety.**



This presentation will proceed through the substantial changes to CSA B149.2-20 and will jump to the resulting changes to the Saskatchewan Code of Practice to B149.2 (slides with a light blue background) as these areas come up.



1 Scope

Please note that in this presentation:

- *Clauses with major revisions will be shown* in normal type.
- *Words added into a clause will be shown* ***bold and underlined*****.**
- *Words deleted from a clause will be shown ~~strikethrough~~ in red .*
- *Comments (like these) will be in italic type with blue highlighting.*

B149.2-20 Propane Storage and Handling - Scope

1.2 This Code does not apply to

(a) transportation of propane;

(b) manufacture, selection, and use of standardized means of containment under the Transportation of Dangerous Goods Act and Regulations;

(c) containers which have never contained propane or are identified as having been purged to less than 10% of the LEL as determined by a calibrated gas meter;

Once purged, the container is considered "steel only".

(d) marine or pipeline terminals;

(e) gas where used as a feedstock in petroleum refineries or chemical plants;

(f) utility pipeline distribution and transmission pipelines;

(g) refrigerated storage or underground ~~reservoirs~~ **formations** for propane;

(h) propane used on boats;

(i) propane used as a propellant in aerosol containers;

(j) butane fuel cylinders of ~~5.3 oz (150 g)~~ **6.2 oz (175 g)** capacity or less;

(k) any equipment extending downstream from the inlet to any container pressure regulator (commonly referred to as first-stage regulator);

(l) the installation of propane fuel system components and tanks on vehicles covered by CSA B149.5; and

(m) propane used as refrigerant.

B149.2-20 Propane Storage and Handling – General

New 4.1.4 (revised)

Where a conflict exists between the manufacturer's ~~certified~~ installation instructions and this Code, the requirements of this Code shall prevail unless otherwise approved.

The word "certified" has been removed.

Rationale: "because not all installation instructions are certified"

B149.2-20 Propane Storage and Handling – General

5.11.5 (revised)

It shall be the responsibility of the user to remove from service any propane-fuelled ~~industrial tractor or lift truck~~ **equipment** where the equipment or container is damaged or malfunctioning.

Rationale:

"to apply to all applications where propane is used as a motor fuel in other than motor vehicles, such as ice-resurfacing machines."

B149.2-20 Propane Storage and Handling – Cylinders

6.1.12 (revised)

On a cylinder from which liquid is to be withdrawn:

a) the liquid service connection of the cylinder valve shall be threaded with other than the standard female POL thread; and

b) the liquid service outlet of the cylinder valve shall be provided with an internal excess-flow valve **except for a cylinder for use in a Hot Air Balloon and in accordance with the exemption 1.50 Hot Air Balloon Cylinder under the Transportation of Dangerous Goods (TDG) Regulations of Transport Canada.**

Hot air balloons do not require an internal excess flow valve for liquid withdrawal.

B149.2-20 Propane Storage and Handling – Cylinders

New clauses for cylinders used in hot air ballooning:

6.4.7

A prefill inspection shall be required for filling a hot air balloon cylinder.

6.4.8

The acceptability of a hot air balloon cylinder for filling can be verified by finding the cylinder listed in the flight log for that aircraft and in accordance with Clause 6.1.12-(b).

6.4.9

Subject to Clauses 5.2.1 and 5.2.2, a crew member shall be present and supervise the proper filling of the cylinders under the provisions of Clause 6.1.12-(b).

6.4.10

Hot air balloon cylinders shall not be required to be removed from the aircraft for filling.

B149.2-20 Propane Storage and Handling – Cylinders

6.4.5 (new clause)

A sleeve on the cylinder shall be removed to facilitate the visual inspection prior to filling the cylinder.

B149.2-20 Propane Storage and Handling – Cylinders

6.5.2.6.1 Propane cylinder exchange for resale

Facilities operating cylinder exchange stations for propane that are accessible to the public shall comply with the following requirements:

a) Cylinders shall be secured in a lockable, ventilated metal cabinet or other approved enclosure.

b) No more than four adjacent cabinets that may be located against a noncombustible building wall at one retail site.

c) No more than one cabinet may be located against a combustible wall.

d) Each cabinet shall contain no more than 500 lb (225 kg) of propane.

e) Each cabinet shall be located a minimum of:

- **i. 3 ft (0.9 m) from any building opening,**
- **ii. 10 ft (3 m) from any mechanical air intake,**
- **iii. 25 ft (7.6 m) from the line of adjoining property occupied by schools, churches, hospitals, athletic fields, or other points of public gathering.**

This change moves the requirements (in bold) out of the notes in fine print under Table 6.3, and into the main body of the code. The requirements remain the same.

B149.2-20 Propane Storage and Handling – Cylinders

6.5.2.6.1 Propane cylinder exchange for resale (continued)

f) Cylinders shall be accessible only by authorized personnel or by use of an automated exchange system in accordance with 6.5.2.6.2 Automated cylinder exchange machine.

g) A sign shall be posted on the entry door of the business operating the cylinder exchange stating “DO NOT BRING PROPANE CYLINDERS INTO THE BUILDING”.*

*The equivalent French wording is “NE PAS APPORTER DES BOUTEILLES DE PROPANE Á L’INTÉRIEUR DU BATIMENT”.

h) An emergency contact information sign shall be posted within 10 ft (3 m) of the cylinder storage cabinet.

i) Electrical equipment within 5 ft (1.5 m) of cylinders stored for resale shall meet the requirements of Table 7.6, part K.

j) Protection of cylinders for resale shall be in accordance with 6.5.4.2(b), **however, protection shall not be required for 20 lb (9 kg) cylinders provided they are in cabinets as noted in 6.5.2.6.1-a).**

Posts for vehicle protection are no longer required for propane cylinder exchange cabinets.

B149.2-20 Propane Storage and Handling – Cylinders

6.5.2.6.1 Propane cylinder exchange for resale (*NEW SCOP*)

J) Protection of cylinders for resale shall be in accordance with 6.5.4.2(b), however, protection shall not be required for 20 lb (9 kg), **or 30 lb (13.5 kg),** cylinders provided they are in cabinets as noted in 6.5.2.6.1-a).

We expand the exemption for vehicle protection of propane cylinder exchange cabinets to include those holding 30 lb. cylinders, as well as those holding 20 lb. cylinders.

Deleted SCOP –No longer required

5.3.2.1

Storage cages/cabinets are removed from requiring further vehicular traffic protection when placed on a raised 6 inch (150 mm) minimum concrete pad at least 8’ (2.44 m) from a driving lane.

B149.2-20 Propane Storage and Handling – Cylinders

6.5.3.8 (revised)

Moving a propane cylinder from one level to another level or the roof of a building may be done using

(a) a freight, service elevator, or construction hoist; or

(b) a public passenger elevator ~~or escalator~~, provided only the person(s) involved with the cylinder are in the elevator ~~or on the escalator~~.

Moving a propane cylinder on an escalator is no longer permitted. A gas inspector (in another province) witnessed 20 lb. propane cylinders being loaded by hand on to a moving escalator. No one was at the top of the escalator to retrieve them. The worker did not see a safety issue with this procedure since it met this clause in the code!

B149.2-20 Propane Storage and Handling – Tanks

TABLE 7.5 - Location of tanks at filling plants and container refill centres

All clearances in the Table up until 2015 were values of:

Total water capacity of tanks, USWG (L)

All clearances in the Table starting in 2020 are values of:

Water capacity per tank, USWG (L)

This change aligns with NFPA requirements in the U.S. and is a significant change for large tank farms in Canada. The rationale is that the single largest risk is from a tank developing a leak. When that happens, it is a single tank leaking, not the entire tank farm. The clearances required are now based on the largest tank in the tank farm, not the total capacity of the tank farm.

B149.2-20 Propane Storage and Handling – Tanks

7.19.4.2 *(Added wording underlined and bolded)*

Guardrails used for the protection of a tank shall be:

a) of the steel deep beam type, 12 × 162 in (300 × 4050 mm), supported by **at least two** 6 in (150 mm) minimum pressure treated wooden posts **or at least two W6X8.5 (W150X14) minimum galvanized I-beam steel posts** buried not less than 36 in (900 mm) below grade and located not more than 75 in (1875 mm) apart, centre to centre, and the bottom of the beam shall be 18 in (450 mm) above grade; or……..

(see next slide)

B149.2-20 Propane Storage and Handling – Tanks

7.19.4.2 *(Added wording underlined and bolded)*

Guardrails used for the protection of a tank shall be:

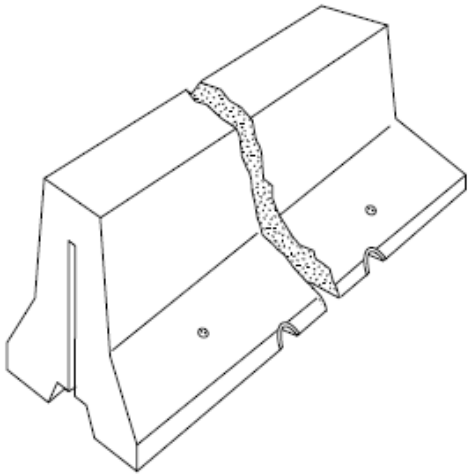
b) of the reinforced concrete barrier type, commonly referred to as the New Jersey Turnpike barrier, not less than 30 in (750 mm) in height. **See Figure D.1 in Annex D for an illustration of a typical barrier such as Ontario Provincial Standard Drawing precast concrete barrier (OPSD-920.010 or, 911 series); and**

c) **the maximum spacing between the barriers shall not exceed 54 in (1380 mm).**

Annex D (informative)
Barrier protection

Note: *This Annex is not a mandatory part of this Code.*

Figure D.1
Illustration of a typical New Jersey turnpike barrier
(See Clause 7.19.4.2.)



B149.2-20 Propane Storage and Handling – *New Annexes*

Annex O (normative)

Use of Non-Refillable Propane Cylinders in Laboratories/Classrooms in Schools, Colleges and Universities

Note: This Annex is a mandatory part of the Code.

This new Annex provides requirements for small appliances, such as portable Bunsen burners, when connected to non-refillable ("single trip") cylinders, used for educational and instructional purposes only, in accordance with the conditions described in the Annex.

- O.1 Scope/general requirements
- O.2 Classroom quantities
- O.3 Classroom/laboratory use
- O.4 Training and responsibilities
- O.5 Cylinder storage and removal

B149.2-20 Propane Storage and Handling – *New Annexes*

Annex Q (informative)

Temporary use of cylinders at shows, exhibitions or other similar events.

This Annex is not a mandatory part of this Code.

This Annex is designed to be used in conjunction with:

> ***CSA B149.1-20 Annex M -Requirements for the operation of appliances at shows, exhibitions, or other similar events,*** *which applies to appliances that*
>
> *a) are on display at shows, exhibitions, or other similar events; and*
>
> *b) are designed to be: used outdoors, or vented to the outdoors.*

When we get back to having Home and Garden shows, vendors will be able to display and operate gas appliances that would not normally be allowed to operate indoors, or indoors without venting. This Annex goes further to allow these appliances on display to operate off a propane cylinder up to 20 lb. capacity.

B149.2-20 Propane Storage and Handling – *New Annexes*

Annex R (informative)

Inspection and servicing of pressure relief devices on tanks

This Annex is not a mandatory part of this Code.

This Annex provides information on PRD requirements:

a) for visual inspection, not to exceed every 5 years.

b) for replacement on tanks greater than 2500 USWG, not to exceed every 10 years, and

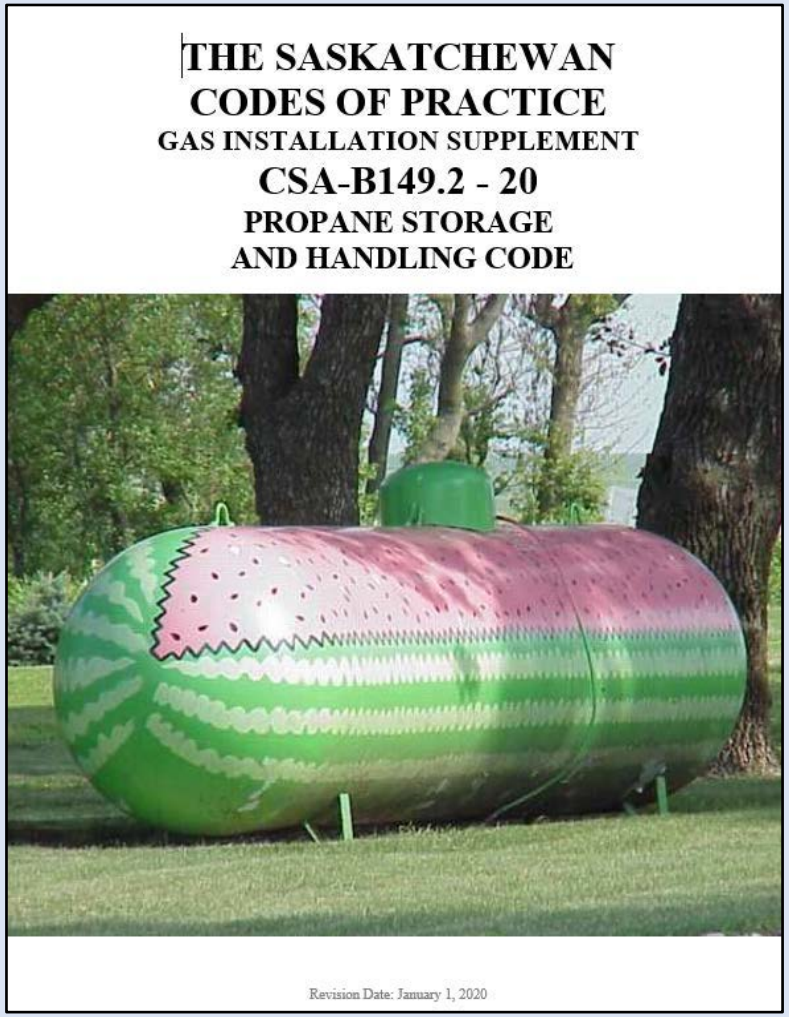
c) for replacement on tanks 2500 USWG or less, not to exceed every 25 years.

Thank you for reviewing the first section of this presentation of the substantial changes to B149.2-20 and the resulting changes to the Saskatchewan Code of Practice to CSA B149.2-20

The next section of this presentation provides changes to the Saskatchewan Code of Practice to CSA B149.2-20 resulting from recent experiences.

Technical Safety Authority of Saskatchewan

B149.2-20 Propane Storage and Handling Code



Saskatchewan Codes of Practice 2020

B149.2-20 Propane Storage and Handling Code - Cylinders

6.5.2.6.3.2 *(new SCOP for 2020 –but was a previous requirement)*

At all retail propane cylinder exchange cabinets, and automated cylinder exchange machines, a sign shall be prominently displayed and be worded as follows: “TRANSPORT CYLINDERS SECURED IN AN UPRIGHT POSITION IN A VENTILATED SPACE” in red lettering that is a minimum of 1 inch (25 mm) high on a white background.

With the recent re-organizations to the national code, this requirement still exists in clause 7.12.10 for Filling Plants, but it is missing from the requirements for a Propane Exchange retailer. The requirements for transportation of a full cylinder are the same regardless of how the customer receives a full propane cylinder.

B149.2-20 Propane Storage and Handling Code - Cylinders

7.4.1 *(new SCOP)*

Subject to 7.4.2 to 7.4.4, and 7.5.2, each tank opening utilized for propane flow shall be equipped with an excess-flow valve sized for the application. Common practice is that the excess flow valve setpoint should be at least 50% larger than the maximum flow rate of the load to avoid nuisance trips.

To prevent services being installed without an excess flow valve when one is required, and to provide guidance in sizing the excess flow valve's rated capacity.

B149.2-20 Propane Storage and Handling Code - Cylinders

7.4.8.1 *(new SCOP –adding wording underlined in bold)*

Any line utilized for propane flow shall have a flow capacity **to atmosphere** greater than the design flow rate of the excess-flow valve protecting the line. **To approximate a line's propane flow capacity to atmosphere, the line shall have a vapour flow capacity based on Annex A of CSA B149.1, or a liquid flow capacity based on Appendix A of this SCOP, of at least 75% of the rated capacity of the excess flow valve protecting the line.**

B149.2 words this clause as the line needs to be large enough to exceed the excess-flow valve rating (when broken). Alias, the excess-flow valve rating needs to be small enough that it trips. Lines are sized according to a relatively small pressure drop. When a line breaks, the pressure drop is 100% (to zero gauge pressure). A line sized for 3 USGPM will flow more than 4 USGPM (excess-flow valve rating) when severed.

Technical Safety Authority of Saskatchewan

B149.2-20 Propane Storage and Handling

Length (ft)	TUBING (ID)						SCH 80 PIPE (NPS)					
	¼	3/8	1/2	5/8	3/4	1	1/2	3/4	1	1¼	1½	2
10	*(7,110)*	14,760	29,700	51,210	72,090	142,830	21,060	44,460	86,670	175,590	261,450	503,820
20	*(4,950)*	*(10,440)*	20,970	36,180	50,940	107,370	14,940	31,410	60,930	124,200	184,770	356,220
30	*(4,050)*	*(8,550)*	17,100	29,520	41,580	87,660	14,220	25,650	49,860	101,610	151,020	290,610
40	*(3,510)*	*(7,380)*	14,850	25,560	36,000	75,870	*(10,350)*	22,230	43,290	87,840	130,770	251,910
50	*(3,150)*	*(6,570)*	*(13,230)*	22,860	32,220	67,860	*(9,630)*	19,980	38,700	78,570	116,910	225,810
60	*(2,880)*	*(6,030)*	*(12,060)*	20,880	29,430	62,010	*(8,460)*	18,000	35,280	71,730	106,560	205,920
70	*(2,610)*	*(5,580)*	*(11,160)*	19,350	27,180	57,330	*(8,010)*	16,830	32,940	66,690	98,910	190,530
80	*(2,430)*	*(5,220)*	*(10,440)*	18,090	25,470	53,640	*(7,290)*	15,750	30,690	62,100	92,790	178,290
90	*(2,340)*	*(4,860)*	*(9,900)*	17,010	24,030	50,580	*(6,930)*	14,580	28,800	58,680	87,030	167,940
100	*(2,160)*	*(4,680)*	*(9,360)*	16,200	22,770	47,970	*(6,750)*	14,220	27,180	55,620	82,800	159,120
125	*(1,980)*	*(4,140)*	*(8,370)*	14,490	20,340	42,930	*(6,120)*	*(12,690)*	24,570	49,860	73,980	142,650
150	--	*(3,780)*	*(7,650)*	*(13,230)*	18,540	39,150	--	*(11,520)*	22,230	45,270	67,500	129,960
175	--	*(3,510)*	*(7,110)*	*(12,240)*	17,190	36,270	--	*(10,710)*	20,700	42,210	62,460	120,420
200	--	*(3,240)*	*(6,570)*	*(11,430)*	16,110	33,930	--	*(9,990)*	19,170	39,150	58,680	112,680
225	--	*(3,060)*	*(6,210)*	*(10,800)*	15,120	31,950	--	*(9,630)*	18,000	37,170	55,170	106,200
250	--	*(2,880)*	*(5,940)*	*(10,170)*	14,400	30,330	--	*(8,820)*	17,640	35,280	52,560	100,800
275	--	*(2,790)*	*(5,670)*	*(9,720)*	13,680	28,890	--	*(8,460)*	16,470	33,390	49,860	95,850
300	--	*(2,700)*	*(5,400)*	*(9,360)*	13,140	27,720	--	*(8,010)*	15,750	32,220	47,970	91,980
350	--	*(2,430)*	*(4,950)*	*(8,640)*	12,150	25,650	--	*(7,650)*	14,580	29,880	44,100	85,140
400	--	*(2,340)*	*(4,680)*	*(8,100)*	11,340	23,940	--	*(6,930)*	*(13,770)*	27,990	41,400	79,740
450	--	*(2,160)*	*(4,410)*	*(7,560)*	10,710	22,590	--	--	*(13,050)*	26,100	39,150	75,150
500	--	*(2,070)*	*(4,140)*	*(7,200)*	10,170	21,420	--	--	*(11,610)*	24,930	37,170	71,280
550	--	--	*(3,960)*	*(6,840)*	9,720	20,430	--	--	*(11,520)*	23,760	35,280	68,220
600	--	--	*(3,780)*	*(6,570)*	9,270	19,530	--	--	*(11,160)*	22,590	33,750	65,160
650	--	--	*(3,690)*	*(6,300)*	8,910	18,810	--	--	*(10,710)*	21,870	32,580	62,460
700	--	--	*(3,510)*	*(6,120)*	8,550	18,090	--	--	*(10,350)*	21,060	31,410	60,210
750	--	--	*(3,420)*	*(5,850)*	8,280	17,460	--	--	*(9,990)*	20,340	30,330	58,320
800	--	--	*(3,240)*	*(5,670)*	8,010	16,920	--	--	*(9,720)*	19,530	29,160	56,340
900	--	--	*(3,060)*	*(5,400)*	7,560	15,930	--	--	*(9,180)*	18,360	27,630	52,920
1000	--	--	*(2,970)*	*(5,040)*	7,200	15,120	--	--	*(8,460)*	17,640	26,100	50,220

Appendix A -Maximum capacity of Liquid Propane (in thousands of Btu/h) for copper tubing, or Schedule 80 piping gravity fed from a propane tank (no pump) *(new –added by popular demand)*

Flow rates shown in brackets (red italics) are considered too low to be protected by a single 4 USGPM excess flow valve mounted on the tank, per CSA B149.2-20 SCOP 7.4.8.1, and shall not be considered for single line services to a single appliance.

B149.2-20 Propane Storage and Handling Code - Tanks

Eliminated SCOP's

~~**7.10.4** Where end failure of horizontal storage tanks may endanger institutional or assembly building, the tanks shall be placed with the longitudinal axis parallel to such property.~~

~~**7.10.5** Propane motor fuel dispensers and storage tanks located on property occupied by schools shall be located as the following;~~

~~a) Minimum distance between filling plant tanks and educational facilities other than service buildings shall be 100 feet (30 m).~~

~~b) Ends of storage tanks shall not face educational buildings.~~

~~c) Vehicles being filled are to be parked at right angles to storage tank(s).~~

There is no supporting data available to support retaining these two SCOP requirements.

Please help to stop the illegal filling of Single Trip Propane Cylinders!!!

Advertised as:

A Must-Have for Survivalists, Hikers, Outdoor Enthusiasts, Tailgaters, Campers, Hunters, Fishermen, Handymen and anyone that cooks on a small grill!

The PRD on these cylinders is not designed for repeated loading and off-loading, and it cannot be replaced when it wears.

Please help us to prevent a tragedy by discouraging this illegal practice!

Complete with instructions on how to overfill the cylinder

Technical Safety Authority of Saskatchewan

Thank you for reviewing this presentation of the substantial changes to B149.2-20 and the changes to the Saskatchewan Code of Practice to CSA B149.2-20

If you have any questions, it is likely that others have the same question. Please contact your local gas inspector, or

Doug Hird, Senior Engineer
Gas Codes and Standards
doug.hird@tsask.ca

We will be posting on-line a running Q&A so no question goes unanswered.