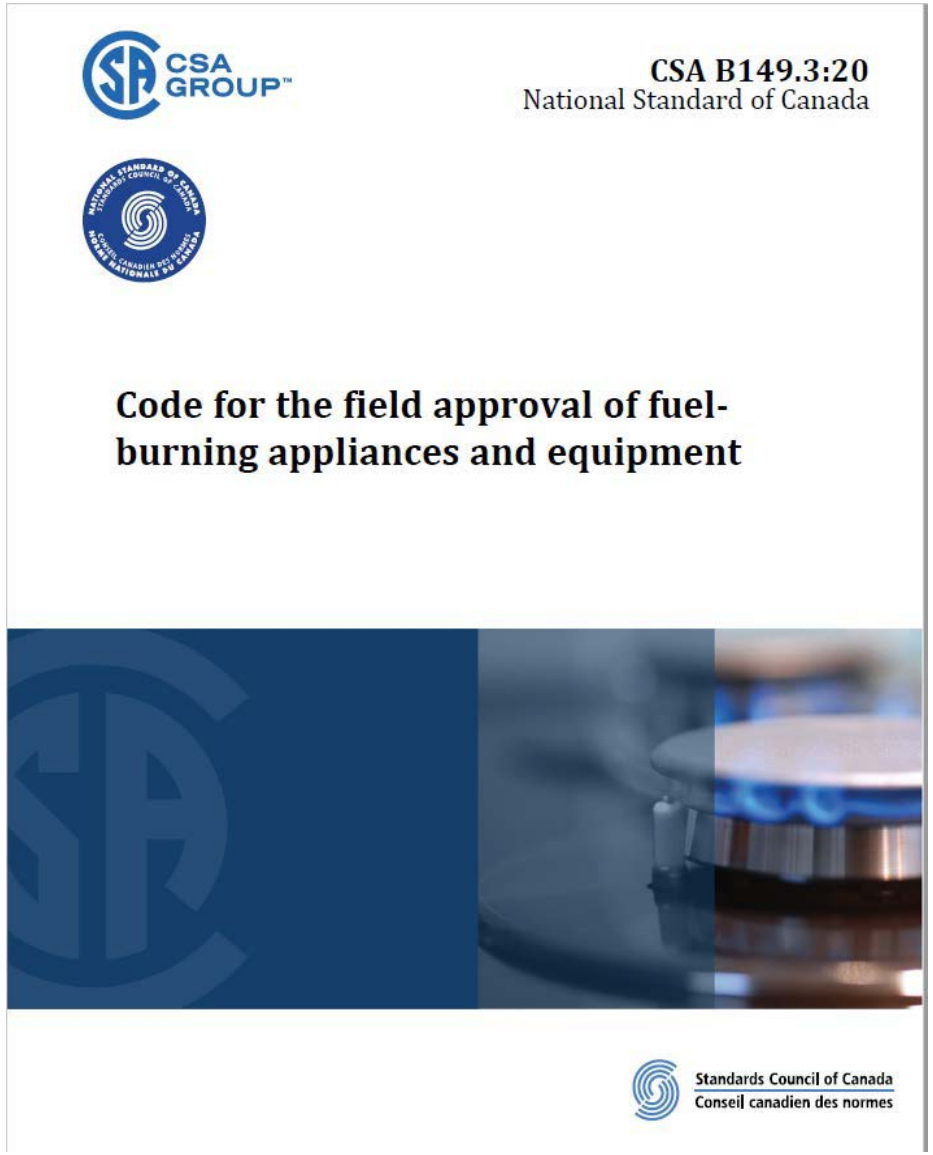
TSASK

TECHNICAL SAFETY AUTHORITY OF SASKATCHEWAN

GAS INSPECTIONS

2020 Gas Contractor Presentation
CSA B149.3-20



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

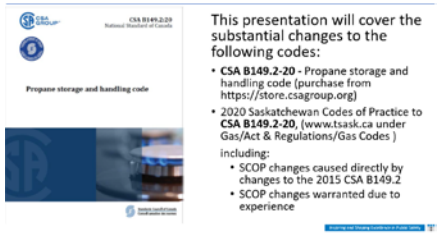
- **CSA B149.3-20** Code for the field approval of fuel-burning appliances and equipment (purchase from https://store.csagroup.org)
- 2020 Saskatchewan Codes of Practice to **CSA B149.3-20**, (www.tsask.ca under Gas/Act & Regulations/Gas Codes)

  including:

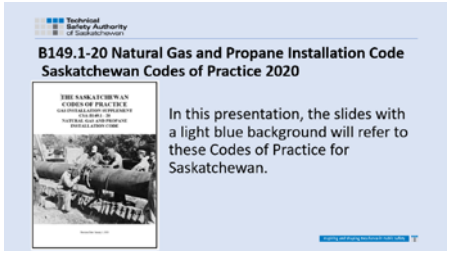
  - SCOP changes caused directly by changes to the 2015 CSA B149.3
  - SCOP changes warranted due to experience

Technical Safety Authority of Saskatchewan

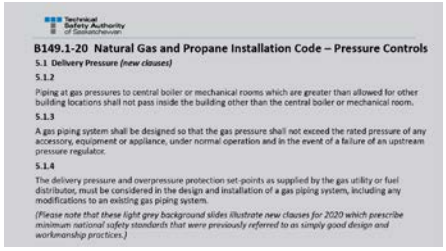
B149.3-20 – Field Approval of Fuel-Burning Appliances - Color Coding in this Presentation



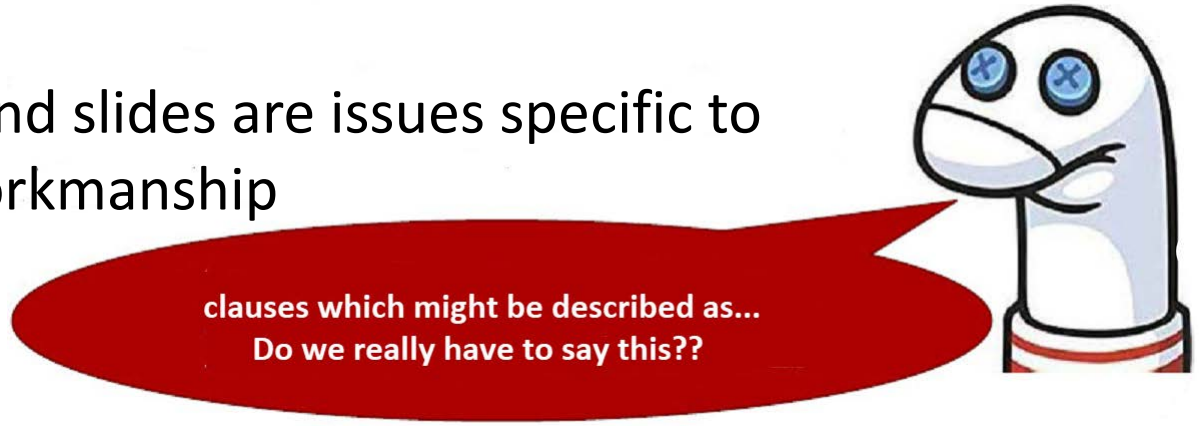
- White background slides refer to the national code.



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



- Light grey background slides are issues specific to good design and workmanship



B149.3-20 Field Approval of Fuel-Burning Appliances Saskatchewan Codes of Practice 2020

THE·SASKATCHEWAN¶
CODES·OF·PRACTICE¶
GAS·INSTALLATION·SUPPLEMENT¶
CSA-B149.3·-·20¶
CODE·FOR·THE·FIELD·APPROVAL¶
OF·FUEL-BURNING¶
APPLIANCES·AND·EQUIPMENT¶
¶
Section Break (Next Page)

January·1,·2021¶

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.**

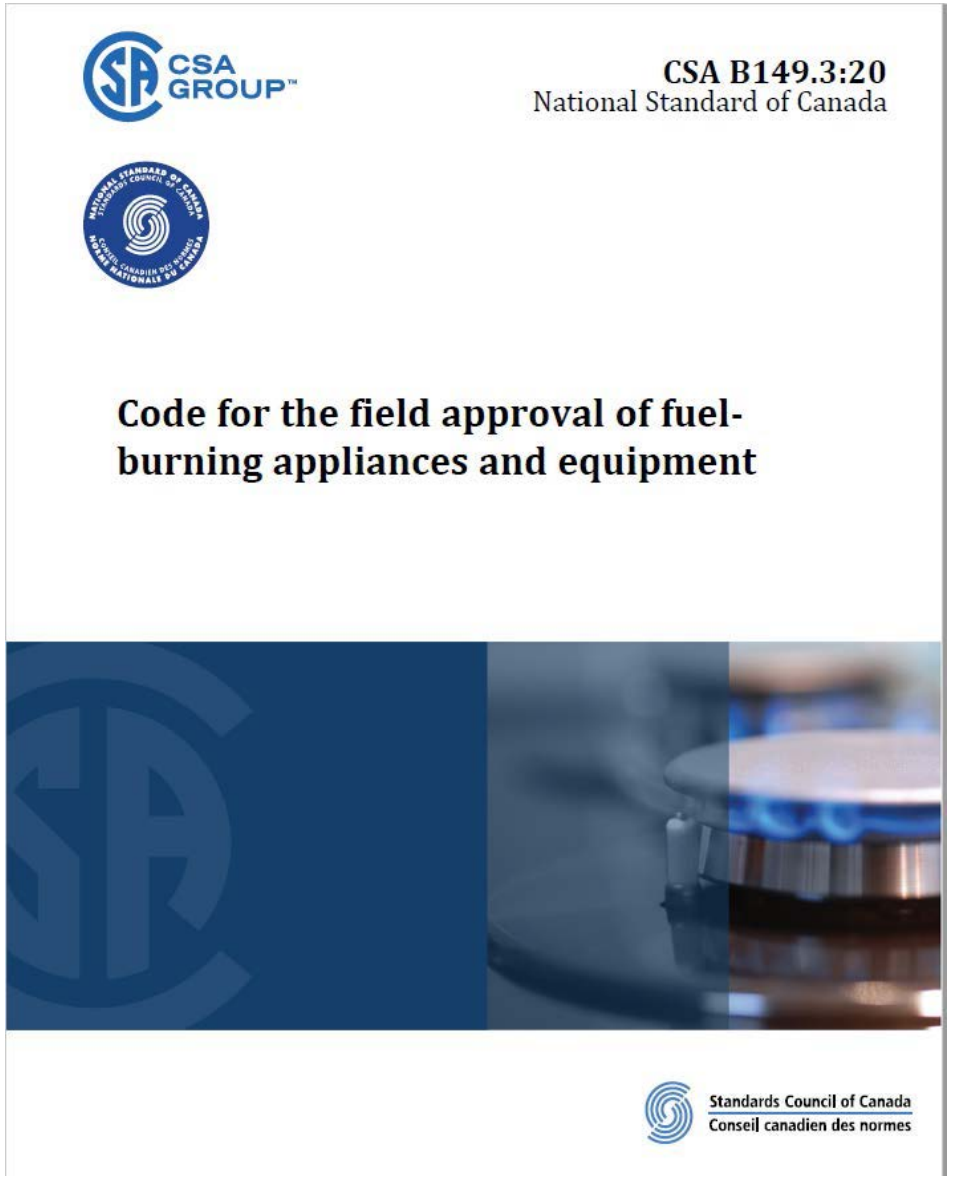
Scope of this Presentation

- The items addressed in this presentation are only to identify substantial **technical** changes to the Canadian Code and the Saskatchewan Codes Of Practice.
- For example – the next slide shows some of the changes made to the code to combine or reorganize requirements in a more logical order, but the technical requirements remain the same.
- **You are strongly encouraged to review the 2020 Code and Saskatchewan Codes of Practice in their entirety.**

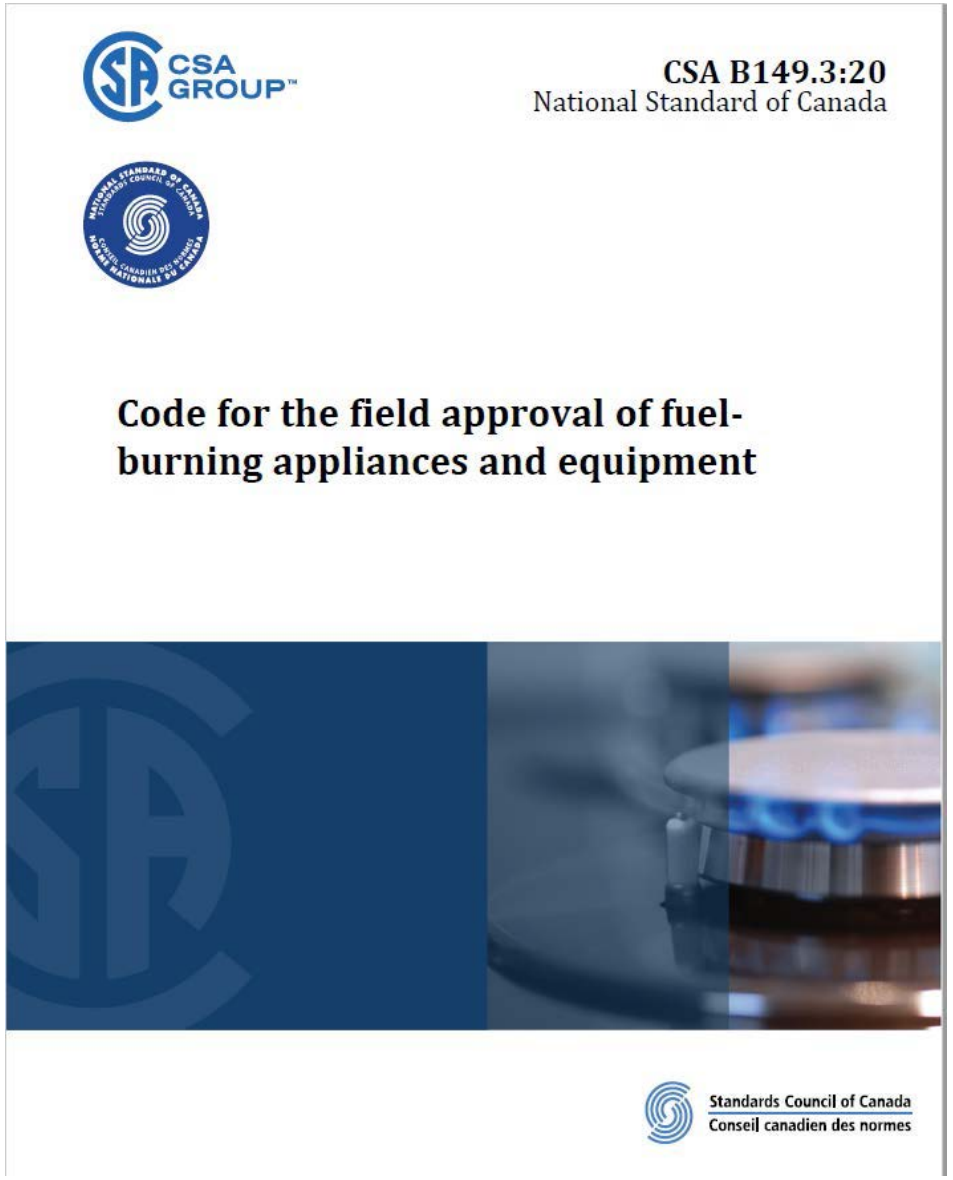
B149.3-20 – Field Approval of Fuel-Burning Appliances

Reorganization of clauses without technical change:

CSA B149.3-15 Clauses	CSA B149.3-20 Clauses
4.1.1 - 4.1.2 - 4.1.3	5.1 - 10.1.7
4.1.4	5.2
4.2.2 - 4.2.3 - 5.5.2 - 4.6.4 - 5.5.3	6.2
4.6.1 - 4.6.2 - 5.5.1	6.4 - 6.5
4.7.2	7.2.2
4.1.2	10.1.7 - 5.1
7.4 – 5.7.1	10.4.1 – 10.4.2 – 10.4.3



This presentation will proceed through the substantial changes to CSA B149.3-20 and will jump to the resulting changes to the Saskatchewan Code of Practice to B149.3 (slides with a light blue background) as these areas come up.



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*

1 Scope

B149.3-20 – Field Approval of Fuel-Burning Appliances - Scope

1.5

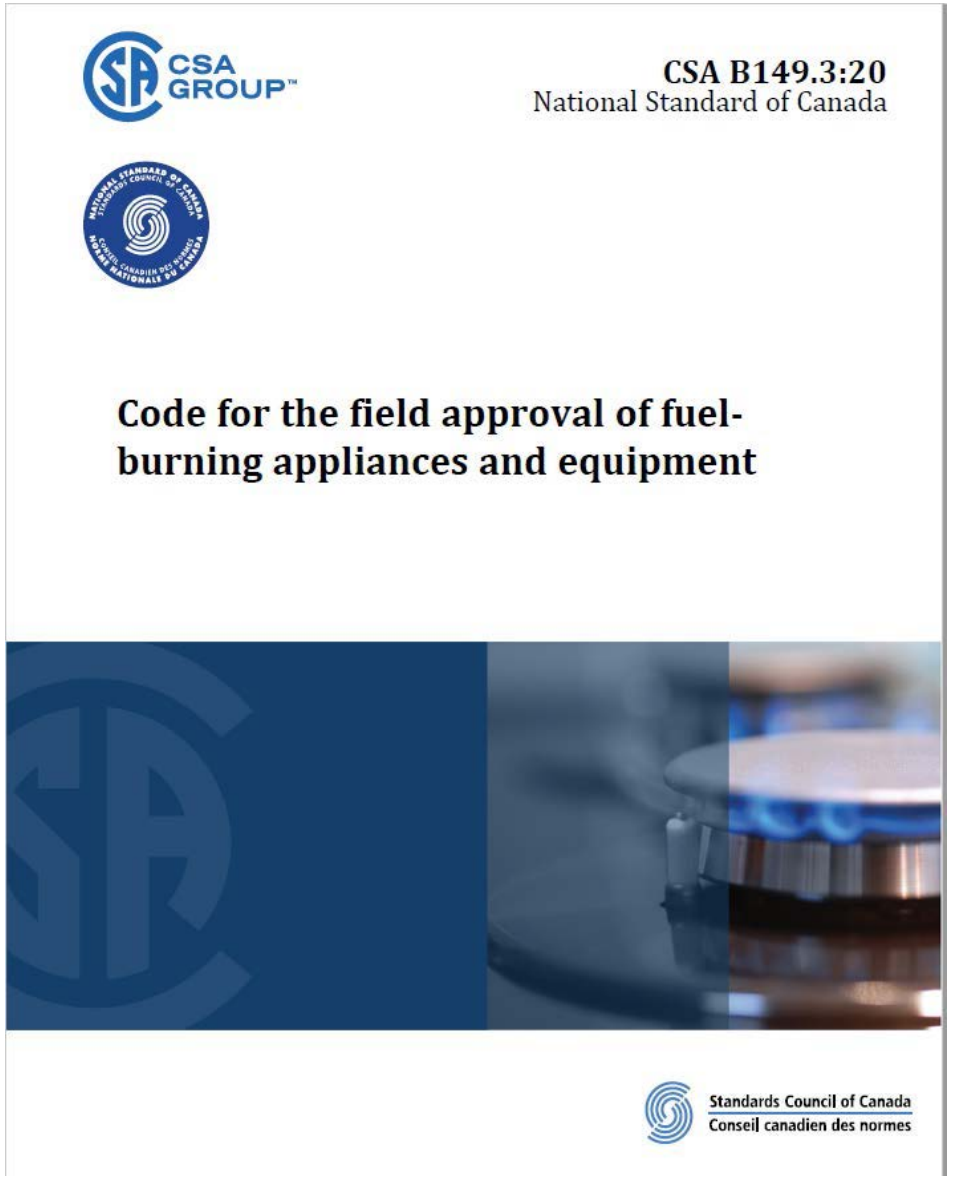
The requirements contained in this Code apply

(a) to new non-certified appliances and equipment of all inputs for which there is no approved Standard;

(b) when the upgrading, **conversion or changes to the control system** of a certified or non-certified appliance is required; and

(c) to programmable logic controllers or microprocessor-based controls used for flame safety and fuel air ratio control.

This change is to clarify that this Code can be used on new certified appliances. For example: a new certified unit purchased with the expectation of utilizing one particular fuel and then that fuel not being available, or changes to the control system such as reverting to single point positioning as opposed to parallel positioning.



3 Definitions

B149.3-20 – Field Approval of Fuel-Burning Appliances - Definitions

Please refer to the code to review the following new definitions:

Burner -Self-Piloted

Complex and integrated facility

Engine

Field approval

Flame front generator

Flare

Flare pilot

Locally ignited flare pilot

Locally ignited flare pilot

Flare pilot automatic ignition system

Flare pilot manual isolation valve

Fuel

Non aerated raw gas burner

Portable Appliance/Equipment

Protected inlet pressure

Proven low fire start

Safe Location

Safety Relay

Turbine

B149.3-20 – Field Approval of Fuel-Burning Appliances - Definitions

Protected Inlet Pressure (*New definition)*

the maximum inlet pressure to a pilot or main pressure regulator caused by a failure of a single upstream pressure regulator.

New SCOP –Definitions

Protected Inlet Pressure

the maximum inlet pressure to any component of a gas piping system, caused by a failure of a single upstream pressure regulator, and as limited by the setpoint and capacity of an overpressure protection device.

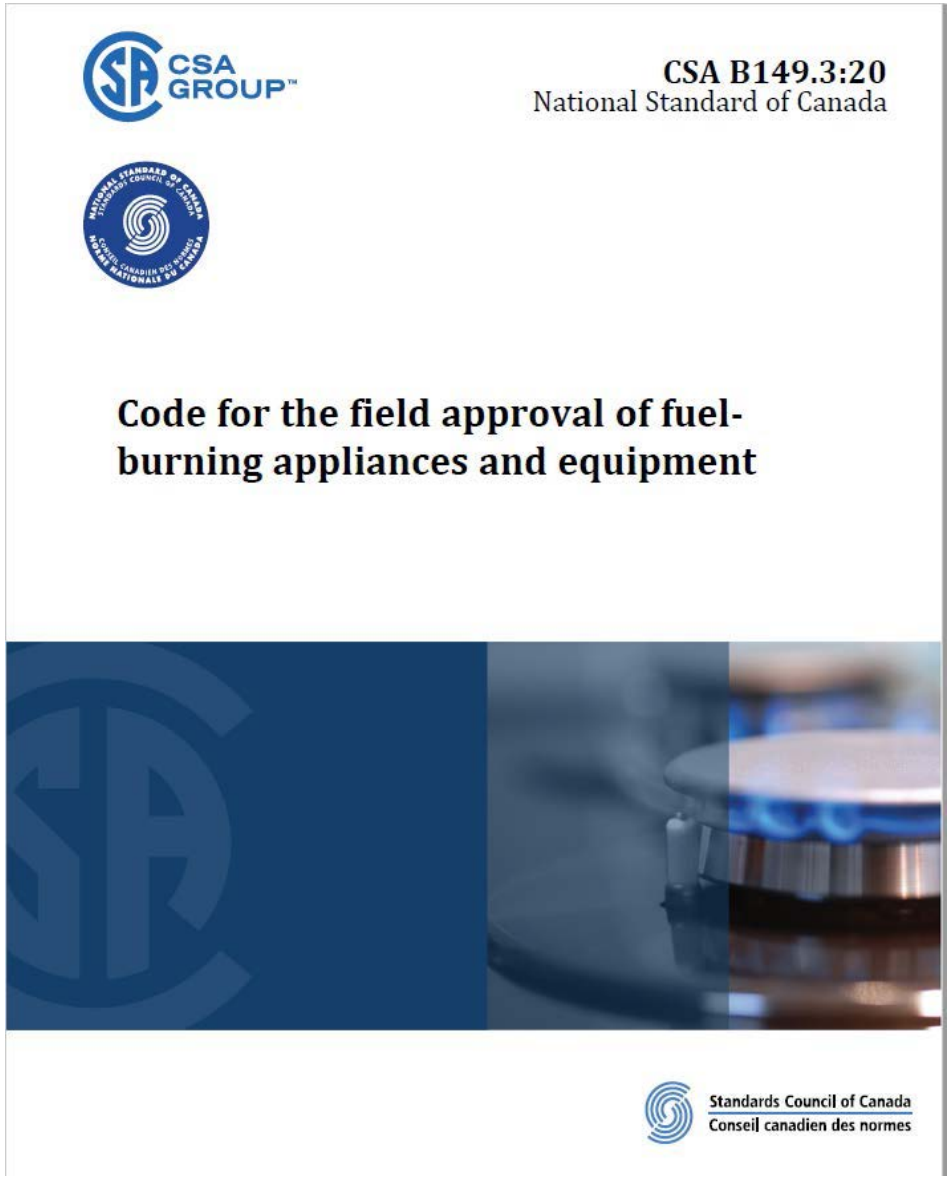
B149.3-20 – Field Approval of Fuel-Burning Appliances - Definitions

Old definition **Valve train** *(2015)*

~~the combination of valves, controls, piping, and tubing of an appliance upstream from the manifold through which gas is supplied to the appliance and by which gas is controlled.~~

New definition **Valve train** *(2020)*

all gas confining valves, controls, piping, fittings, and hoses of an appliance downstream of the manual shut-off valve specified in Clause 6.18.2 of the CSA B149.1 to the inlet of the burner.



4 Pressure Regulators

B149.3-20 – Field Approval of Fuel-Burning Appliances – Pressure Regulators

The 2015 Sections

- **4.3 Pressure regulators and**
- **5.2 Pressure regulators**

Have been relocated and combined into:

2020 Section

- **4 Pressure regulators**

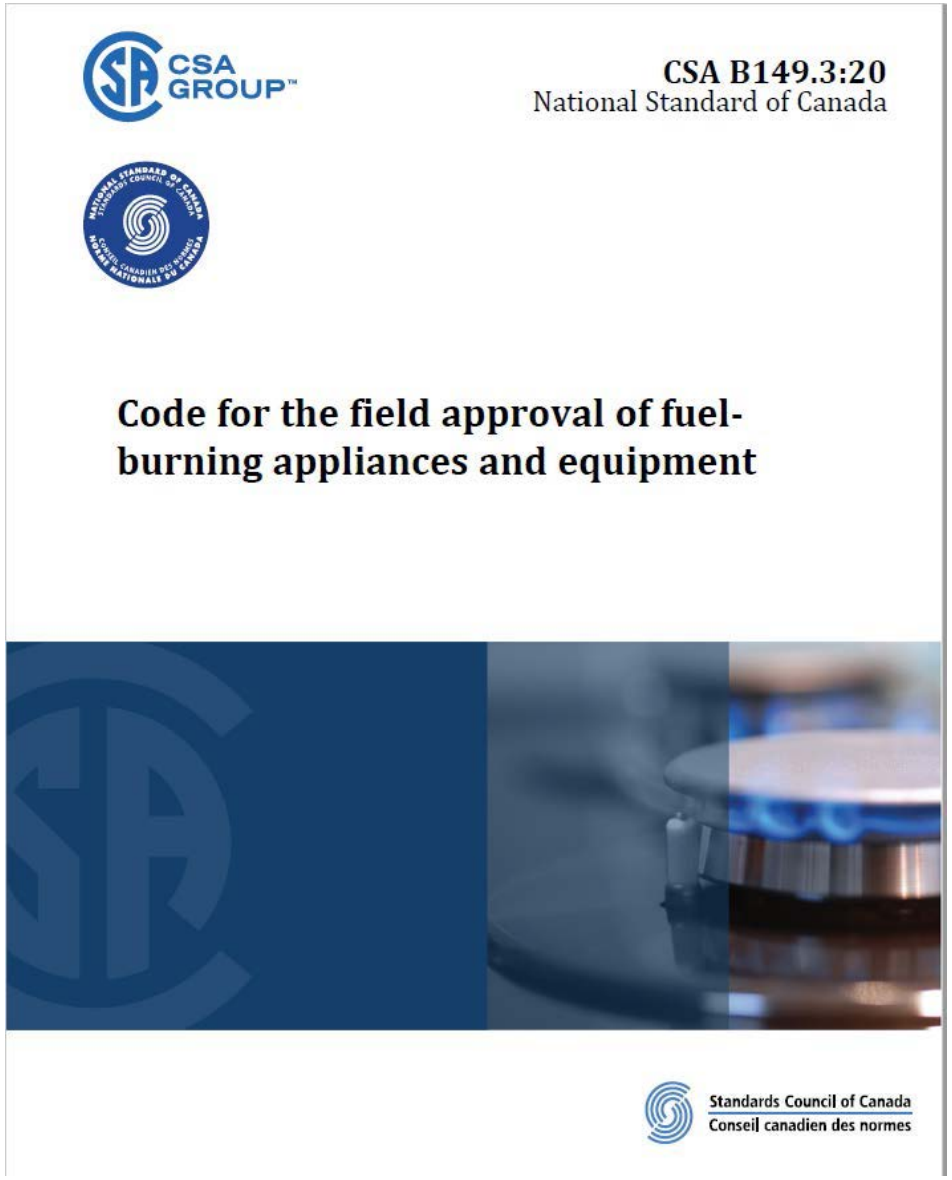
The requirements have been relocated and combined to improve logical sequence of requirements.

B149.3-20 – Field Approval of Fuel-Burning Appliances – Pressure Regulators

~~5.2.3~~ 4.4

The pressure regulator shall be capable of maintaining an outlet pressure to within ~~10%~~ 20% above or below the regulator set pressure during burner operation from minimum to maximum firing rates.

To match actual feasibility



7 Pilot Safety Shut-off Valves and Burner

B149.3-20 – Field Approval of Fuel-Burning Appliances – Pilot SSV's and Burner

(4.7.2 becomes 7.2.2)

7.2.2

A pilot shall be designed, installed, **and adjusted** to ~~ensure~~ **provide** safe and reliable ignition of the main burner **and that there will be no injurious flame impingement on heating surfaces that can cause incomplete combustion or damage to these surfaces.**

Previous Clauses 4.7.6, 4.7.7, and 4.7.8 are deleted

The requirement for pilots to be large enough to ensure safe and reliable ignition conflicts with the previous clauses that dictated the maximum input of the pilot based on a percentage of the input to the main burner. The safe and reliable ignition requirements for pilots apply to all appliance inputs.

B149.3-20 – Field Approval of Fuel-Burning Appliances – Pilot SSV's and Burner

7.2.7 *(new)*

A pilot burner shall maintain stability of the designed flame shape, with neither flashback nor blow-off, over the entire burner firing range. In addition, a pilot turndown test, or similar method, shall be conducted to prove that the pilot is capable of reliably lighting the main burner in credible firing conditions.

Rationale:

"A pilot should have to meet the same requirement as a main flame, and a pilot turndown test is a critical part of assessing the pilot burner`s ability to consistently light the main flame smoothly."

B149.3-20 – Field Approval of Fuel-Burning Appliances – Pilot SSV's and Burner

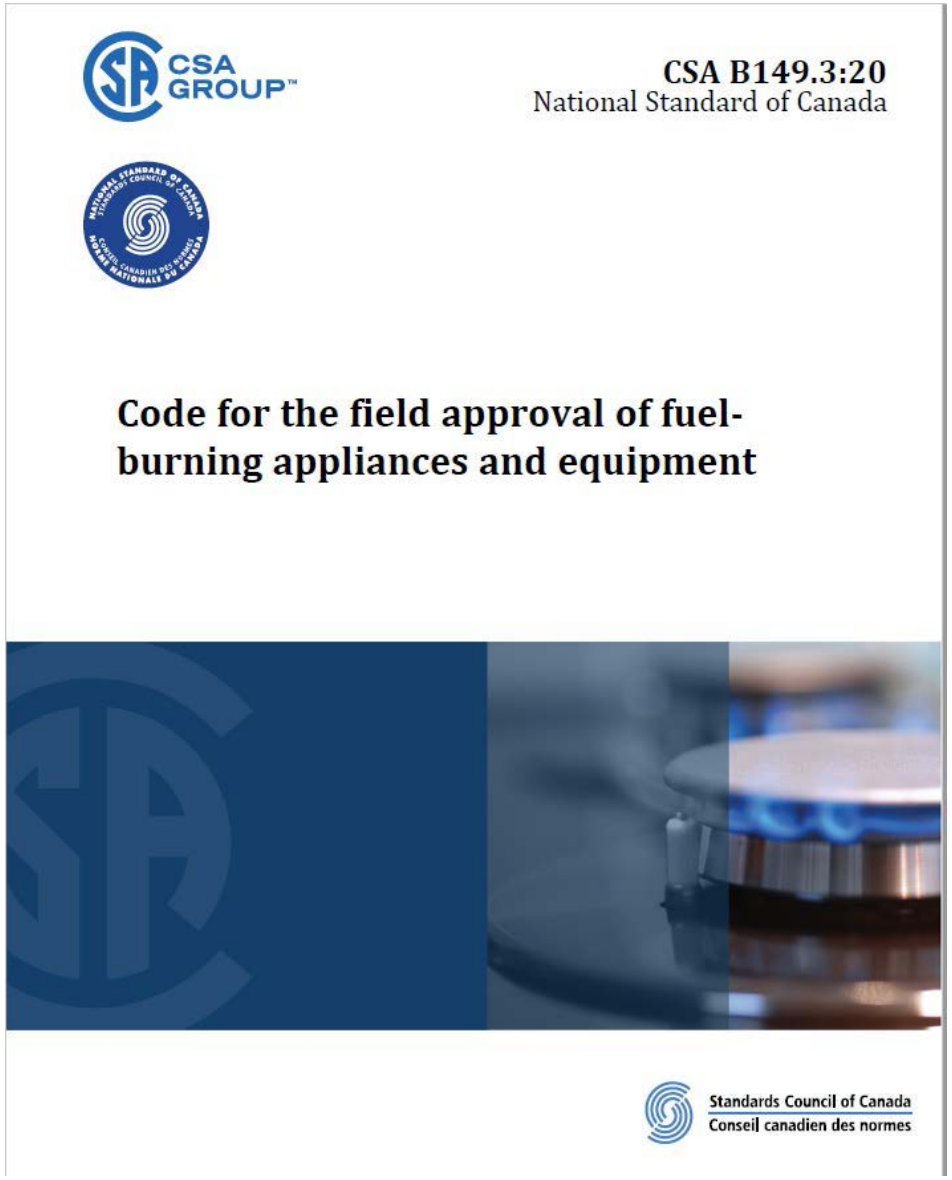
7.3 Self-Piloted Burner (new)

The pilot portion of a self-piloted burner shall meet the requirements contained in Clause 4 to Clause 7 and Clause 10 and all applicable clauses where the term pilot is used…

Rationale:

To provide clear support in the code for self-piloted burners

(a.k.a. "slip-stream pilot" burners).



8 Main Safety Shut-off Valves, Input Flow Control Systems and Main Burners

B149.3-20 – Field Approval of Fuel-Burning Appliances – Main SSV's and Burner

(5.3.1 becomes 8.1.1 and 5.3.4 becomes 8.1.4)

8.1.1 A safety shut-off valve shall

(a) for input ratings up to and including ~~200 000~~ **400 000** Btu/h ….;

(b) for input ratings in excess of ~~200 000~~ **400 000** Btu/h ….;

8.1.4 A single burner appliance that has a rated input up to and including ~~200 000~~ **400 000** Btu/h ….;

In 2015, the code incorrectly lowered the capacity of a combination control valve from 400,000 btu/h to 200,000 btu/hr. This change is a correction back to 400,000 btu/h as written in 2010.

Deleted SCOP –No longer required

5.3.1 –5.3.4 –5.3.5

These SCOPs to the 2015 edition provided the correct 400,000 btu/hr capacity for a combination control valve in Saskatchewan.

B149.3-20 – Field Approval of Fuel-Burning Appliances – Main SSV's and Burner

[adding subsections (f) and (g)]

8.1.1 A safety shut-off valve shall

(f) not be bypassed except as required for operation of an approved valve proving system (VPS); and

(g) when more than one valve is required, be wired in parallel except as required for operation of an approved valve proving system (VPS).

B149.3-20 – Field Approval of Fuel-Burning Appliances – Main SSV's and Burner

(5.6.5 becomes 8.3.5)

8.3.5 When a ~~manually adjusted~~ combustion airflow controlling device is provided on a burner, it shall be

(a) capable of any desired adjustment to provide sufficient air for the combustion process;

(b) provided with a means to prevent an unintentional change in setting;

(c) constructed and mounted such that air leakage is minimized; and

(d) accessible for service and adjustment.

Whether the combustion airflow controlling device is manually or automatically controlled, the same requirements should apply.

B149.3-20 – Field Approval of Fuel-Burning Appliances – Main SSV's and Burner

(5.6.6 becomes 8.3.6)

8.3.6 When a combustion airflow controlling device on a burner is operated automatically, it shall

(a) comply with the requirements of Clause 8.3.5; and

(b) be designed to ~~provide maximum airflow~~ **mitigate hazardous conditions** upon failure of its operating mechanism.

Some applications could result in a hazard if the airflow goes to maximum upon failure of the operating mechanism. The change keeps the original intent of calling attention that failures in the mechanism could lead to an unsafe state.

B149.3-20 – Field Approval of Fuel-Burning Appliances – Main SSV's and Burner

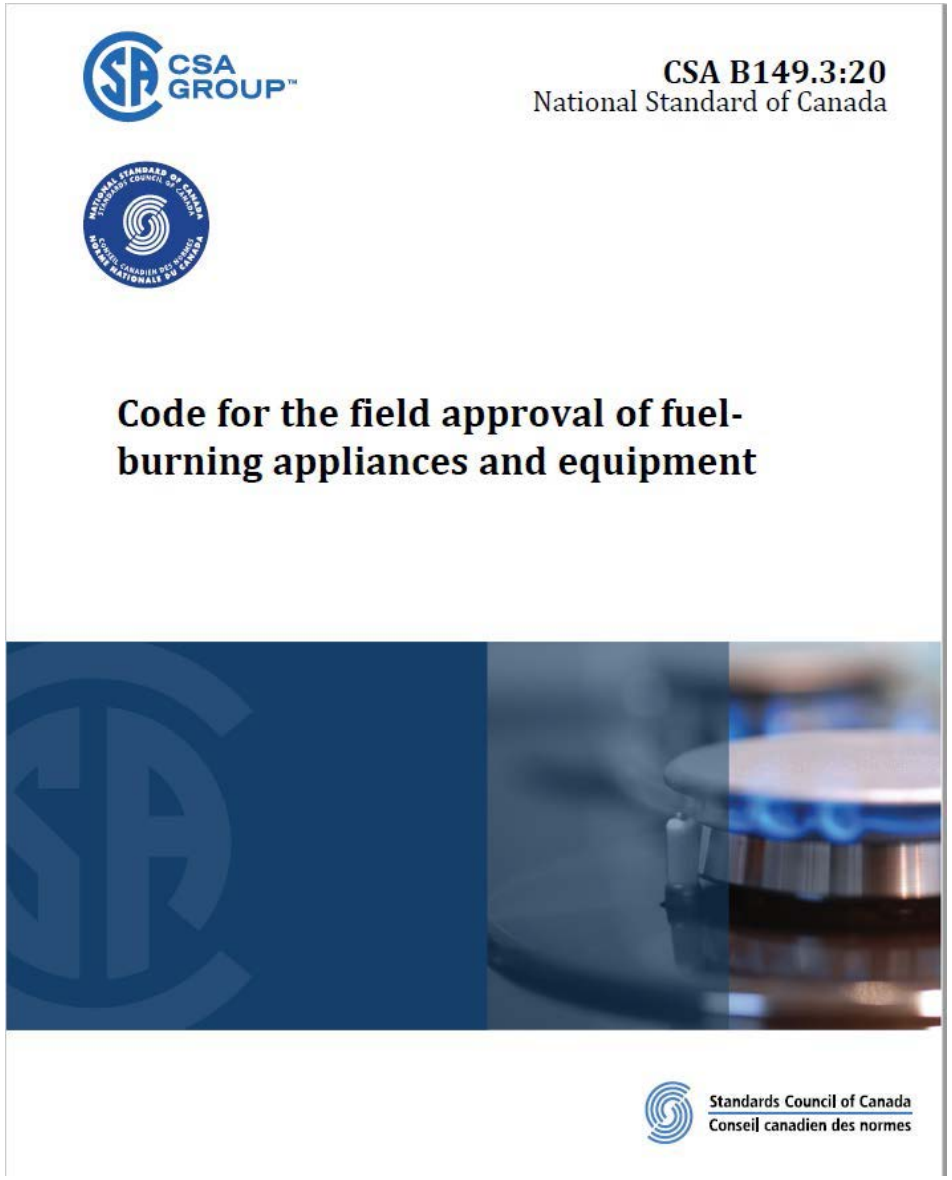
(5.6.15 becomes 8.3.15)

8.3.6 Where a non-aerated raw gas burner is used, ~~a differential airflow~~ **an airflow** proving device shall be provided ~~to measure differential pressure across the profile plates~~ to ensure combustion air velocity is within the minimum and maximum limits specified by the burner manufacturer over the full range of operation. The airflow proving device shall be

(a) connected electrically in series in the safety limit control circuit; and

(b) set to automatically shut down the burner where the limits specified by the burner manufacturer are exceeded.

Clause 5.6.15 was too specific on the air flow proving device requirements.



9 Additional Requirements for Liquid Propane Valve Trains

B149.3-20 – Field Approval of Fuel-Burning Appliances – Propane Valve Trains

(6.1 becomes 9.1)

9.1

All piping shall be Schedule 80 or heavier, **flanges shall be minimum Class 150 and all other fittings shall be minimum Class 300**.

Deleted SCOP –No longer required

6.1.1

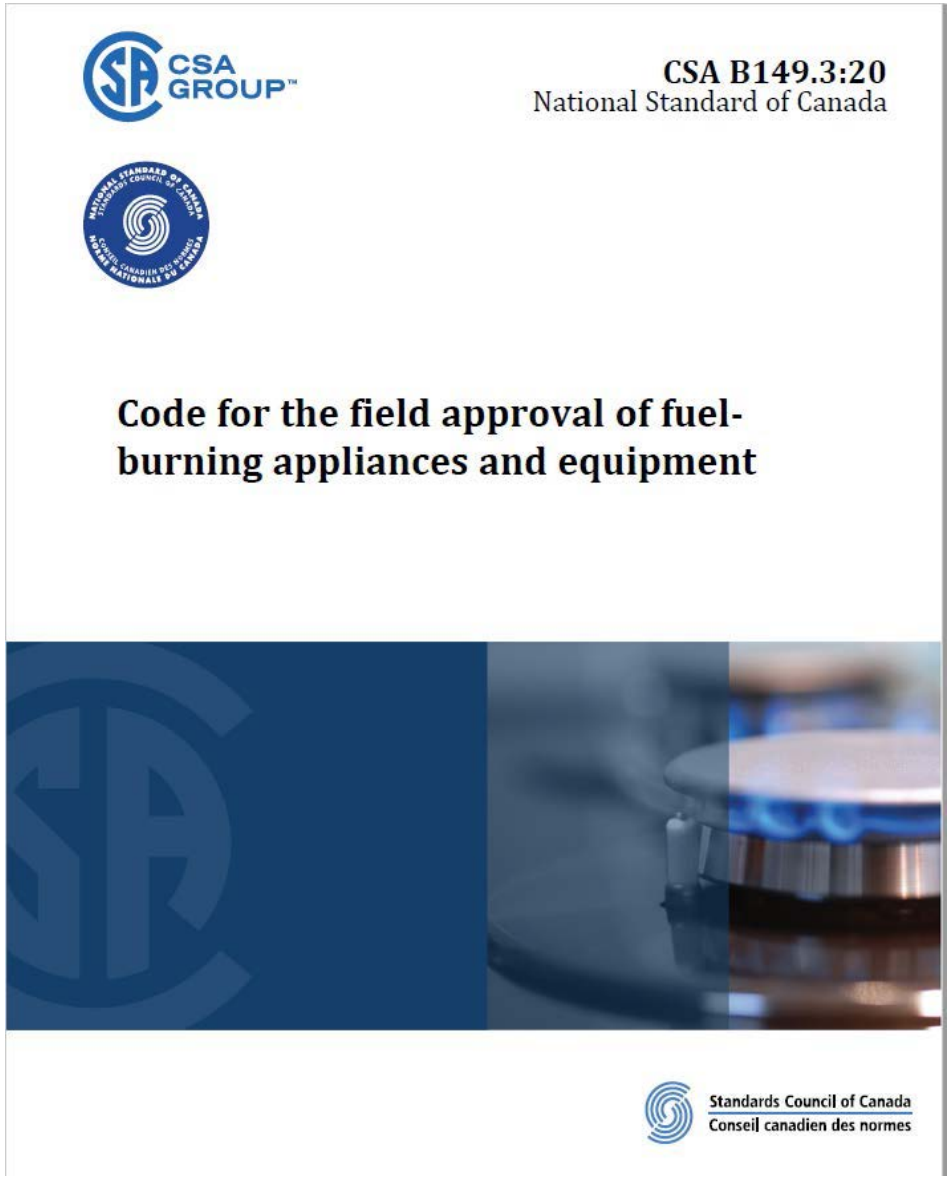
All fittings on schedule 80 valve train systems shall be minimum Class 300.

B149.3-20 – Field Approval of Fuel-Burning Appliances – Propane Valve Trains

(6.5 becomes 9.5)

9.5 Where dictated by the valve train design, the liquid propane regulator may be located immediately upstream of the test firing valve **or may be omitted when the supply pressure to the burner valve train is required to be greater than tank pressure and is being controlled by a pump system equipped with a differential bypass valve and backpressure regulator suitable for use with LPG. Setpoints of the differential bypass valve and backpressure regulator shall be in accordance with the burner manufacturer's installation instructions.**

The pressure control requirements for different types of liquid burners include those which many not want diaphragm type or lock up type regulators used on the fuel train at all. They may require the use of pumps at the tank location and recommend the use of a backpressure regulator used in conjunction with a differential bypass regulator, both installed at the pump location. The design of these burners is such that they need to maintain a set pressure over tank pressure.



10 Applications

B149.3-20 – Field Approval of Fuel-Burning Appliances – Applications

(7.1.7 becomes 10.1.6)

~~**7.1.7 When a filter is used on a gas valve train, a low-pressure or high differential pressure indicator shall be installed directly downstream of the filter.**~~

10.1.6 When a 250 or less micron gas strainer or a 60 mesh or larger filter is used on a gas valve train, a low-pressure indicator or switch shall be installed downstream of the filter/ strainer or a high differential pressure indicator or switch shall be installed across the filter.

The new language allows low gas pressure switches to be used and clarifies where the differential type indicator is to be installed. When filters are strainers are removing large debris (e.g. gravel, large sand particles), there is no need for a low pressure indicator, or a differential pressure indicator, on or across the strainer or filter.

B149.3-20 – Field Approval of Fuel-Burning Appliances – Applications

(new)

10.1.6 When piping is used to construct a valve train, a minimum of schedule 40 shall be used.

B149.1 now allows the use of schedule 10 piping for the gas piping system.

(Joints must use a press-connect style of fitting.)

Valve trains, however, must use schedule 40 piping at minimum, because the continual need for maintenance and replacement of the controls requires either threaded or flanged connections, and cannot be accommodated using press-connect fittings.

Technical Safety Authority of Saskatchewan

B149.3-20 – Field Approval of Fuel-Burning Appliances – Applications

(7.2 becomes 10.2)

10.2

Unions or flanges shall be installed on valve trains for maintenance and replacement of components. **A raised-face flange shall connect to a raised-face flange of the same Class. A flat-faced flange shall connect to a flat-faced flange of the same Class.**

Deleted SCOP –No longer required

7.2.1

A raised-face flange shall connect to a raised-face flange.
A flat-faced flange shall connect to a flat-faced flange.

B149.3-20 – Field Approval of Fuel-Burning Appliances – Applications

(7.3.1 becomes 10.2)

~~**7.3.1 Pressure test points not exceeding NPS 1/4 shall be provided to allow testing of the valve train components and the set-up of the burner.**~~

10.2 The opening for pressure test points shall be orificed 1/4” NPS maximum and shall be provided to allow testing of the valve train components and the set-up of the burner.

A ¼" nipple (even though it is minimum schedule 80 by code) can be bent or broken in industrial applications. This wording still allows a ¼” nipple to be used, but it is also acceptable to use a ½" nipple with a ¼" maximum orifice as an option.

B149.3-20 – Field Approval of Fuel-Burning Appliances – Applications

(5.7.3 becomes 10.4.5)

~~**5.7.3 ….. Note: A token relief valve should not be used as a full capacity relief valve.**~~

SCOP 5.7.3.1 - A token relief valve shall not be used as a full capacity relief valve.

10.4.5 …..

A token overpressure relief device shall not be used as a full capacity overpressure relief device.

A note in a clause in the code is a non-mandatory observation or recommendation. A note in a Table in the code is a mandatory part of the code as an extension or explanation of the Table.

This revision ensures that a token relief valve shall not be used as an OPD, and the Saskatchewan Code of Practice statement is no longer required.

B149.3-20 – Field Approval of Fuel-Burning Appliances – Applications

(7.6 becomes 10.6)

~~**7.6 Bleed vents for valves, combination controls, pressure regulators, relief valves, and other control devices**~~

10.6 Atmospheric and bleed vents for valves, combination controls, pressure regulators, relief valves, and other control devices

The Scope of section 10.6 now covers atmospheric vents as well as bleed vents.

B149.3-20 – Field Approval of Fuel-Burning Appliances – Applications

(7.9.2 becomes 10.9.2)

10.9.2

An ~~electrically~~ heated compartment intended to house controls and valves in accordance with Clause 7.9.1 shall be of non-combustible construction and shall be heated to maintain a temperature within the compartment of at least 18°F (10 °C) higher than the highest minimum (low) ambient rating of any control within the compartment, taking into account the possible effects of wind, snow and ice, if the equipment is intended for use outdoors.

The clause applies to all heated compartments, regardless of the source of heat.

B149.3-20 – Field Approval of Fuel-Burning Appliances – Applications

(new)

10.9.3 A heated compartment shall be equipped with a low limit temperature control that will operate and be interlocked with the flame safeguard to positively prevent operation of the fuel burners if the temperature within the heated compartment for any reason drops 18°F (10°C) below the value specified in Clause 10.9.2.

10.9.4 The low limit temperature control required by Clause 7.9.3 shall be of the automatic recycling type.

For example, Clauses 10.9.1 and 10.9.2 allow a valve with a minimum rating of 0°C to be housed in a hot-box heated to at least +10°C. If the hot box internal temperature drops to 0°C, an unlatched control is required to lock out the burners until the +10°C internal temperature is restored.

B149.3-20 – Field Approval of Fuel-Burning Appliances – Applications

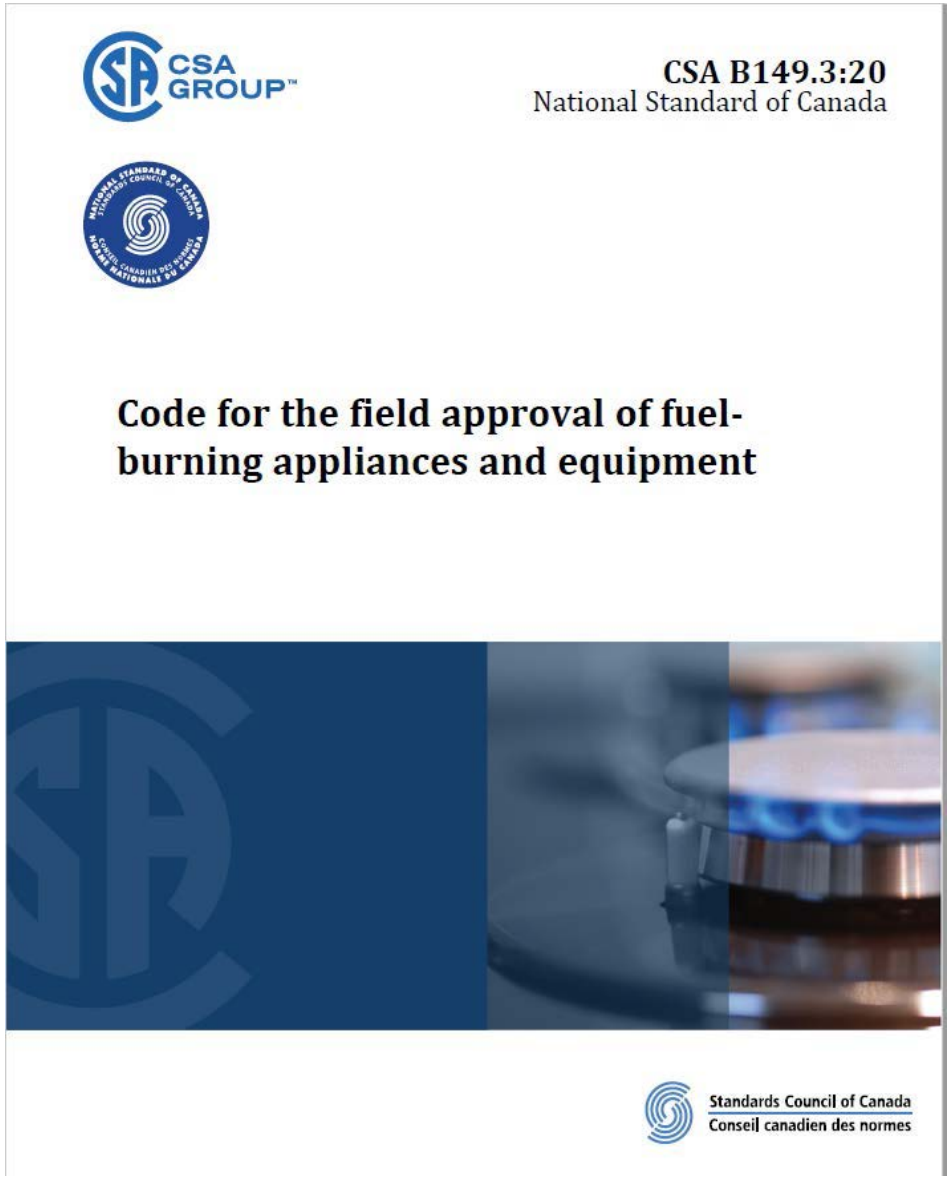
(new) 10.11 Multi-fuel burners

When a dual or multi fuel burner has fuel trains that connect for the purpose of using the same exit holes on the burner for combustion, unless the design is such that it prevents the alternate fuel/s from back feeding through the alternate fuel train/s, suitable means shall be provided to prevent back feeding. Manual shut-off valve or safety shut-off valves, with end switches wired into the limit circuit to allow operation of the alternate fuel when closed, or back pressure check valves may be used as an acceptable solution. These valves, when used shall be installed as close as practicable to the point of interconnection.

Note: The test firing valve required by clauses 4.6.1 and 5.5.1 may be used when equipped with end switches to prove closure.

2015 SCOP No Longer Required

9.5.3.1-When propane is one of the fuels used on a multi-fuel appliance, a check valve shall be installed to restrict the flow of any other gas into the propane piping from the propane container.



12 Safety Controls

B149.3-20 – Field Approval of Fuel-Burning Appliances – Safety Controls

(9.1.4 becomes 12.1.4)

12.1.4

Intermediate relays may be used in the limit circuits, provided that each intermediate relay serves only one safety interlock. **Each intermediate relay shall be rated for at least 100,000 cycles or the number of cycles of its associated safety interlock component, whichever is greater.**

A General Purpose relay could be certified for 6 000, 30 000 or 100 000 cycles. The use of a less reliable relay could lead to a hazard that could be easily avoided. CSA C22.2 NO. 24 – "Temperature indicating and regulating equipment" requires automatic reset limiters to be certified to 100,000 cycles, so the relay associated needs to also be certified to 100,000 cycles for reliability of the system.

B149.3-20 – Field Approval of Fuel-Burning Appliances – Safety Controls

(new)

12.1.5

When the combustion safety control system is not suitably rated for the electrical load of the safety shut-off valves, an intermediate safety relay circuit shall be used.

Added coverage for this situation which happens frequently with large diameter valving systems.

B149.3-20 – Field Approval of Fuel-Burning Appliances – Safety Controls

(9.4.1 becomes 12.4.1)

12.4.1

An appliance that heats a liquid or vapor shall be equipped with **all of the following fuel supply shut off** safety devices **as required for safe operation of the appliance.** The safety devices shall include a manual-reset feature or shall require operator attention before resuming operation:

(a) low liquid level …

(b) low liquid or vapor flow …

(c) high fluid temperature;

Note: Where portions of the appliance are sufficiently independent, multiple temperature sensors might be required;

(d) High **fluid** pressure**…**

(continued next slide…)

B149.3-20 – Field Approval of Fuel-Burning Appliances – Safety Controls

(9.4.1 becomes 12.4.1)

12.4.1

An appliance that heats a liquid or vapor shall be equipped with **all of the following fuel supply shut off** safety devices **as required for safe operation of the appliance.** The safety devices shall include a manual-reset feature or shall require operator attention before resuming operation: ……..

(e) high steam pressure for a steam boiler with a maximum rated input of less than 12.5 MMBtu/h;

(f) high steam pressure for a steam boiler with a maximum rated input greater than or equal to 12.5 MMBtu/h in unattended operation; ~~or~~ **and**

(g) low water level in a water boiler located above the hot-water circulating system.

Added coverage for steam boiler pressure safeties.

B149.3-20 – Field Approval of Fuel-Burning Appliances – Safety Controls

(9.5.3 becomes 12.5.3 and remains unchanged with a Note added)

12.5.3 When a gas pilot is used on a multi-fuel appliance, a low gas pressure safety device shall be installed in the gas pilot supply immediately upstream of the first safety shut-off valve. When the pilot is firing, the low gas pressure safety device shall be in service and shall

(a) shut down the pilot in a low gas condition; or

(b) shut down the main burner in a low gas condition if the pilot is required for stable main burner flame.

If the pilot is an interrupted pilot, this device may be removed from service at the completion of the pilot run time.

Note: A low gas pressure safety device would not be required if the pilot is protected by the main fuel low gas pressure safety device.

It was not previously clear that the pilot PSLL is only required when a different gas than the main gas is used for the pilot.

B149.3-20 – Field Approval of Fuel-Burning Appliances – Safety Controls

(new)

12.5.5

The low gas pressure safety device and high gas pressure safety device shall be of the manual reset type or operator attention shall be required before resuming operation.

Previously, the manual reset function was only required in Clause 13 Additional requirements for process ovens, process furnaces, and atmosphere generators.

CSA boiler codes (3.1 and 4.9) require pressure devices to cause a safety shutdown. All new boilers are shipped with manual reset function.

All LP & HP devices must now be latched controls. An unlatched trip will require a separate setpoint approaching the latched setpoint.

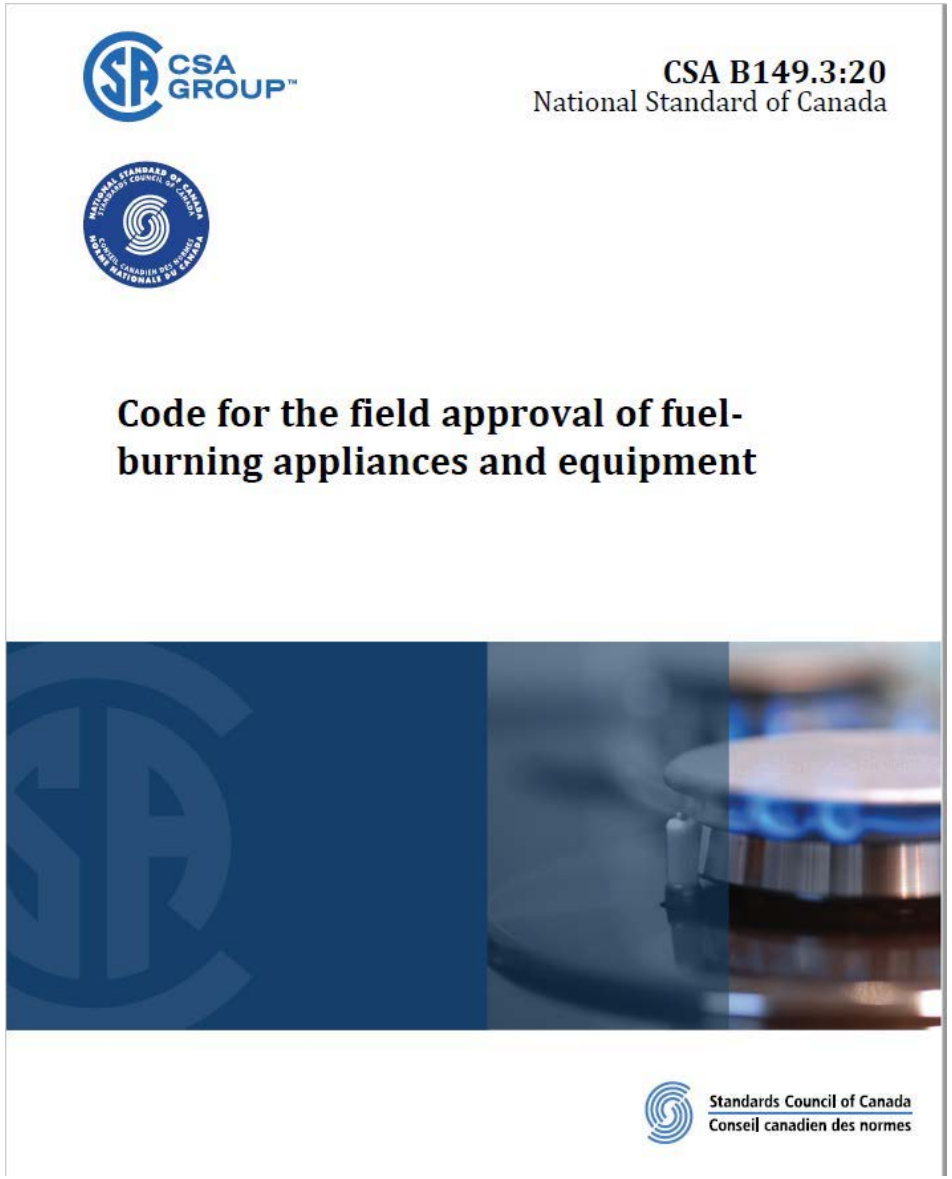
B149.3-20 – Field Approval of Fuel-Burning Appliances – Safety Controls

12.7 Programmable controllers

This section is of vital importance for designers of programmable controllers to review in its entirety.

Revisions to 9.6.1 for clarity, becomes 12.6.1 (also see 12.1.2)

Revisions to 9.7.2.3.1, 9.7.2.3.2, and 9.7.2.3.3
to become 12.7.2.3.1, 12.7.2.3.2, 12.7.2.3.3 and new 12.7.2.3.4
are based upon the general philosophy that it is permissible to bypass a redundant input device, but it is not permissible to bypass a tripping function.



14 Rating Plate

B149.3-20 – Field Approval of Fuel-Burning Appliances – Rating Plate

14 Rating plate

An appliance shall have a clearly legible permanent rating plate that shall include the following information:

a) manufacturer's or vendor's name;

b) appliance type and identification number;

c) electrical specifications;

d) type of fuel(s);

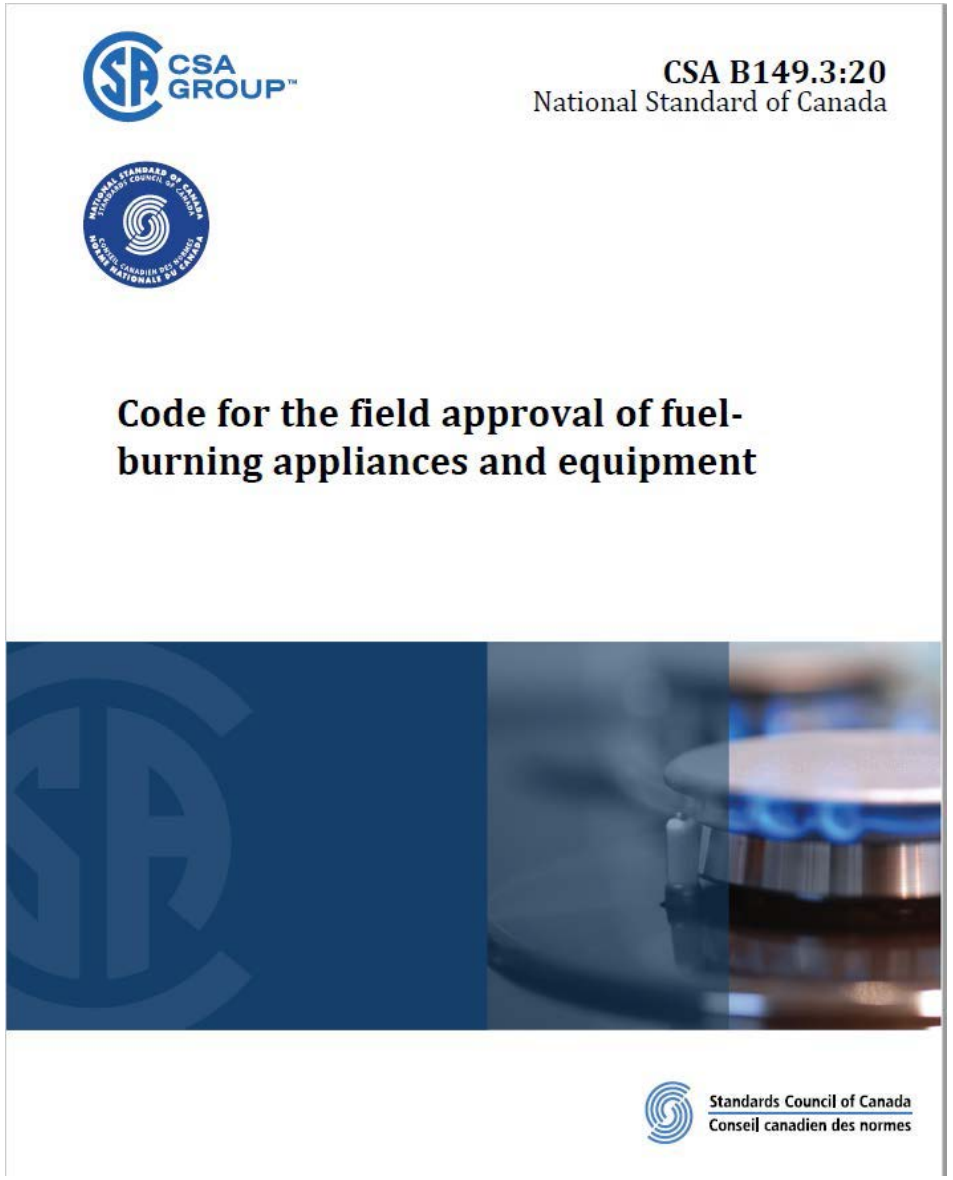
e) maximum input rating in Btu/h (kW) and design altitude in ft (m);

f) **minimum** inlet pressure **and maximum protected inlet pressure** at the point of connection;

g) maximum and minimum burner manifold fuel pressure; and

h) a statement identifying if it is portable.

To support the new section for portable appliances and equipment, Section 20.



16 Additional Requirements for Process Ovens, Process Furnace and Atmosphere Generators

B149.3-20 – Field Approval of Fuel-Burning Appliances – Additional Requirements for Process Ovens, Process Furnaces and Atmosphere Generators

(new)

16.1 Scope

16.1.1

This Clause is intended for appliances used in commercial and industrial processing application (e.g.: heating treating of metal in a hydrogen atmosphere).

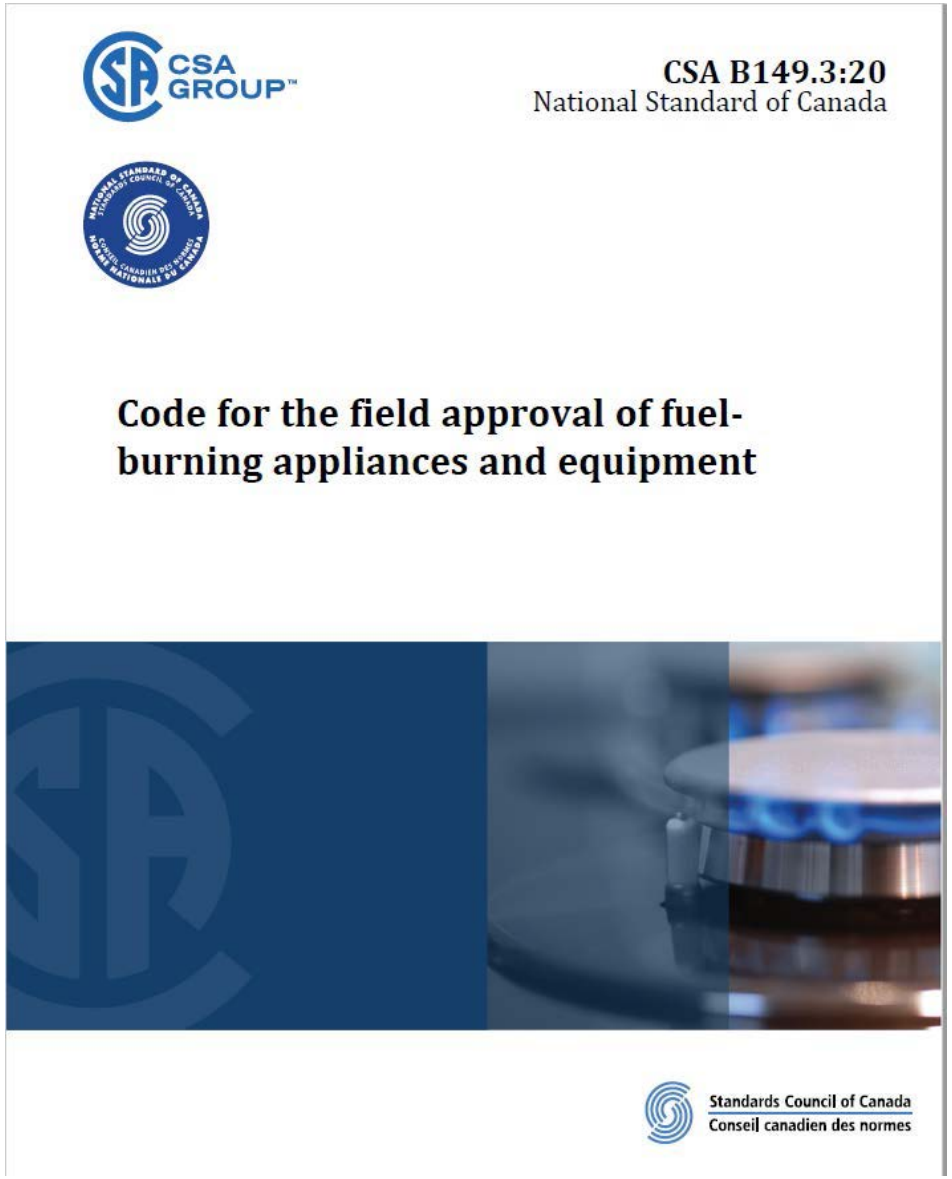
B149.3-20 – Field Approval of Fuel-Burning Appliances – Additional Requirements for Process Ovens, Process Furnaces and Atmosphere Generators

(new) 16.1.2

Clause 16 does not apply to appliances in a facility whose main business activity meets the definition of one of the following North American Industry Classification System (NAICS) Canada 2017 Version 1.0 codes:

- Code 21111 (Oil and gas extraction)
- Code 21114 (Oil sands extraction)
- Code 32411 (Petroleum refineries)
- Code 32511 (Petrochemical manufacturing)
- Code 32519 (Other basic organic chemical manufacturing)
- Code 32521 (Resin and synthetic rubber manufacturing)
- Code 32531 (Fertilizer manufacturing)
- Code 32532 (Pesticide and other agricultural chemical manufacturing)
- Code 32599 (All other chemical product manufacturing)

Note: Due to the nature and process of petroleum refining, some of the requirements in Clause 16 can create hazards for the refining process. Designers typically identify any operating requirements that are needed in addition to Clauses 1 –15 of this Code.



17 Generators, Compressors / Pressure Boosters, Engines and Turbines

B149.3-20 – Field Approval of Fuel-Burning Appliances – Generators, Compressors/Pressure Boosters, Engines and Turbines

CSA B149.1-15 Clauses	CSA B149.3-20 Clauses
7.2.1.1	17.1.1
7.2.2.3	17.2.1
7.2.2.9	17.2.3
7.2.2.11	17.2.4
7.2.4.2 / 7.2.4.3	Compiled as 17.3.2 / 17.3.3 / 17.3.5
7.2.4.5	17.3.6
7.2.4.6	17.3.7
7.2.4.7	17.3.8
7.2.4.8	17.3.9
7.2.4.9	17.5

Compiled requirements from the previous edition of CSA B149.1 positioned downstream of the appliance manual shut-off valve.

B149.3-20 – Field Approval of Fuel-Burning Appliances – Generators, Compressors/Pressure Boosters, Engines and Turbines

(B149.1-15 7.2.2.6 becomes B149.3-20 17.2.2)

17.2.2

A compressor shall be isolated from vibration at the inlet or outlet by a ~~flexible metallic~~ **gas** hose certified to the requirements of **CAN/CSA-8.1**, **CAN/CSA-8.3**, ULC/ORD C536, **or CGA CR96**.

To expand the list of acceptable hose certifications.

B149.3-20 – Field Approval of Fuel-Burning Appliances – Generators, Compressors/Pressure Boosters, Engines and Turbines

B149.1-15 7.2.4.2 / 7.2.4.3

7.2.4.2 *required an engine or turbine to be equipped with a) a 6.5 C/I safety shut-off valve, b) an automatic speed governor, c) a vacuum or LP switch, d) a zero governor regulator, and e) a gas hose.*

7.2.4.3 *required an engine or turbine over 1 million btu/hr to be equipped with a second safety shut-off valve.*

becomes B149.3-20 17.3.2 / 17.3.3 / 17.3.5

17.3.5 *covers requirements for an engine or turbine over 12.5 million btu/hr with inlet pressures greater than 150 psi.*

17.3.3 *covers safety shut-off valve requirements for an engine or turbine not meeting the conditions of clause* ***17.3.5****.*

17.3.2 *covers the other requirements for an engine or turbine not meeting the conditions of clause* ***17.3.5****.*

B149.3-20 – Field Approval of Fuel-Burning Appliances – Generators, Compressors/Pressure Boosters, Engines and Turbines

B149.1-15 7.2.4.2 item e) gas hose has been revised to read

17.3.2

A turbine not falling under Clause 17.3.5 or engine shall be equipped with

e) a gas hose ~~which shall be of a Type I hose connector approved in compliance with~~ **certified to** CAN/CSA-8.1, **CAN/CSA-8.3**, **ULC/ORD C536**, or **CGA CR96**, not exceeding ~~3 ft (1 m)~~ **6 ft (2 m)** in length, where the ~~connector~~ **gas hose** is installed downstream of the safety shut-off valve or valves required under Item a). **The valve train upstream of the gas hose shall be mounted, anchored, and supported in such a manner as to minimize damage to the valve train from the engine or turbine vibration**.

B149.3-20 – Field Approval of Fuel-Burning Appliances – Generators, Compressors/Pressure Boosters, Engines and Turbines

(new) 17.3.1

If the generator is used as Emergency electrical supply system defined by CSA C282 Emergency electrical power supply for buildings, the gas train safety interlocks, if installed, shall be permitted to be wired and operated in accordance with Table 1 of CSA B282.

To remove conflicts in requirements for the wiring of the interlocks between the CSA B149.3 and CSA C282 Emergency electrical power supply for buildings.

B149.3-20 – Field Approval of Fuel-Burning Appliances – Generators, Compressors/Pressure Boosters, Engines and Turbines

(new)

17.3.4

Where the input to an engine or turbine is in excess of 2.5 MMBtu/h (732 kW), a high gas pressure safety device and a low gas pressure safety device shall be installed and set to detect incorrect outlet pressure ranges of the pressure regulator.

B149.3-20 – Field Approval of Fuel-Burning Appliances – Generators, Compressors/Pressure Boosters, Engines and Turbines

(new clause –similar to B149.1-20 clause 7.2.1.9)

17.4.2 The equipment for indoor installation or in an enclosure shall be equipped with a gas detector that

a) is installed in accordance with the detector manufacturer's instructions for the type of gas;

b) is set to activate at gas detection levels at and above one-fifth of the lower limit of flammability;

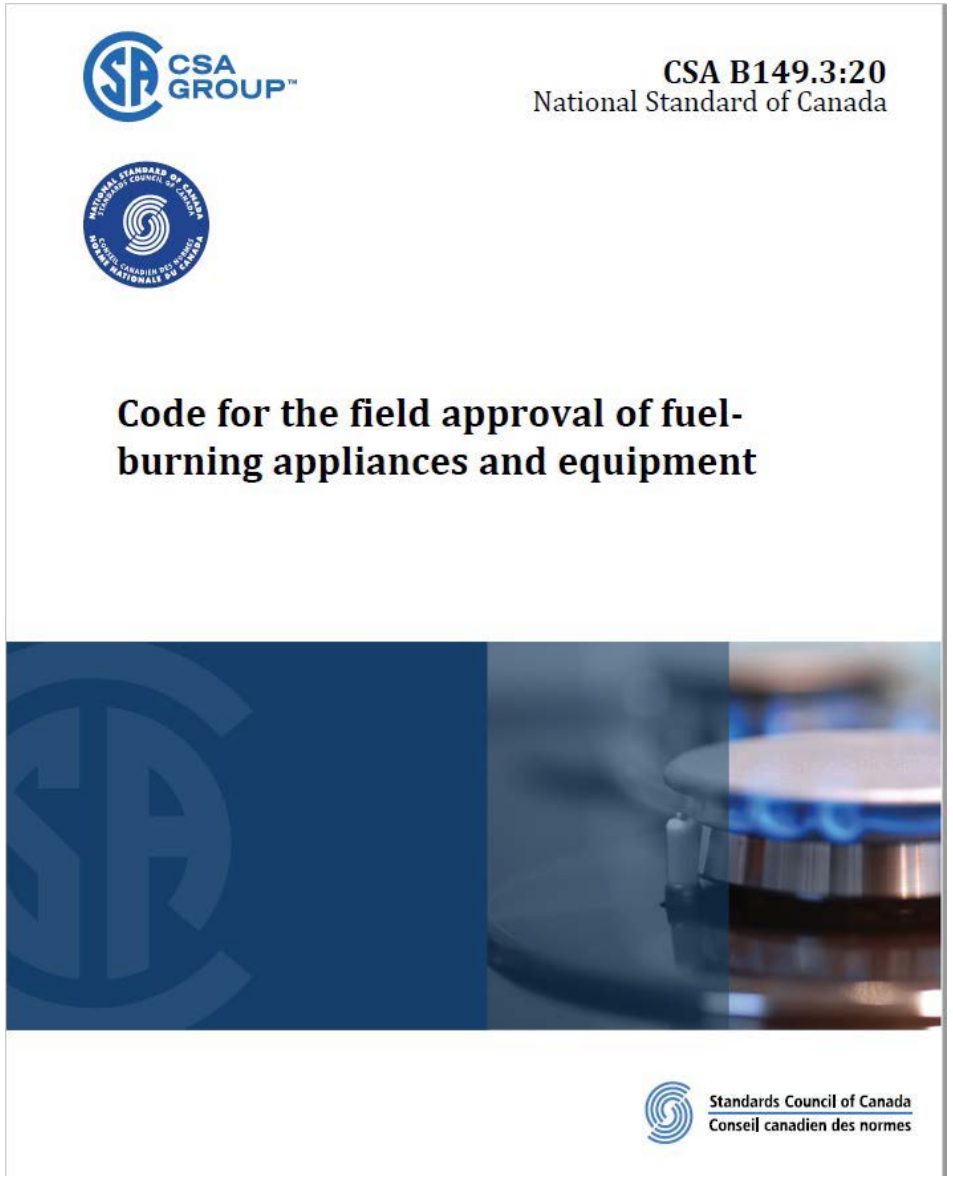
c) upon activation, produces an audible and visual alarm;

d) is interlocked with the mechanical ventilation system; and

e) is interlocked to shut off the equipment.

New SCOP (mirroring SCOP to CSA B149.1)

17.4.2 CSA B149.3-20 requirement 17.4.2(e) "is interlocked to shut off the equipment" is not mandatory in Saskatchewan.



This Section moves the previous non-mandatory Annex into the mandatory body of the code.

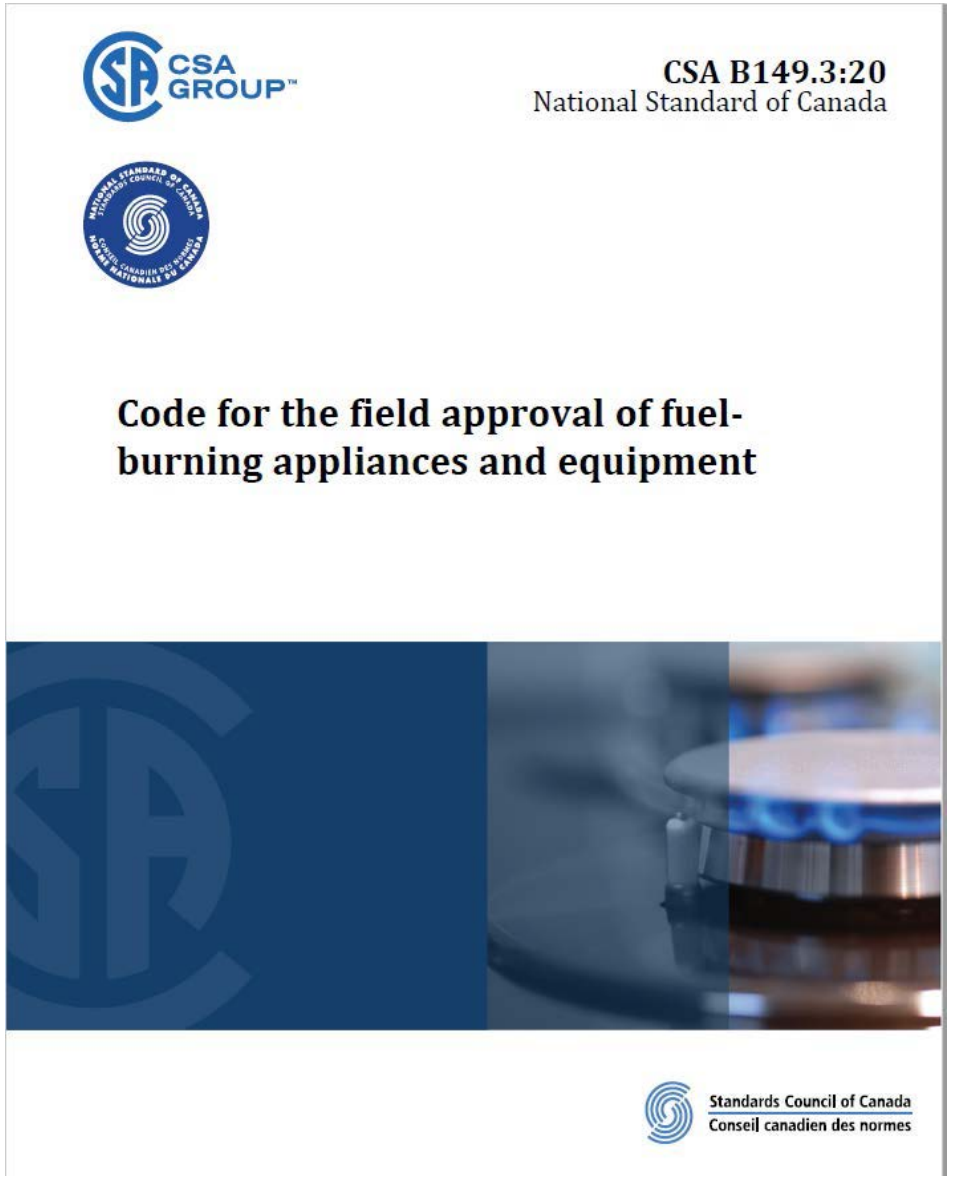
18 Flare Pilot *(New Section)*

B149.3-20 – Field Approval of Fuel-Burning Appliances – Flare Pilot

Deleted SCOP (no longer required)

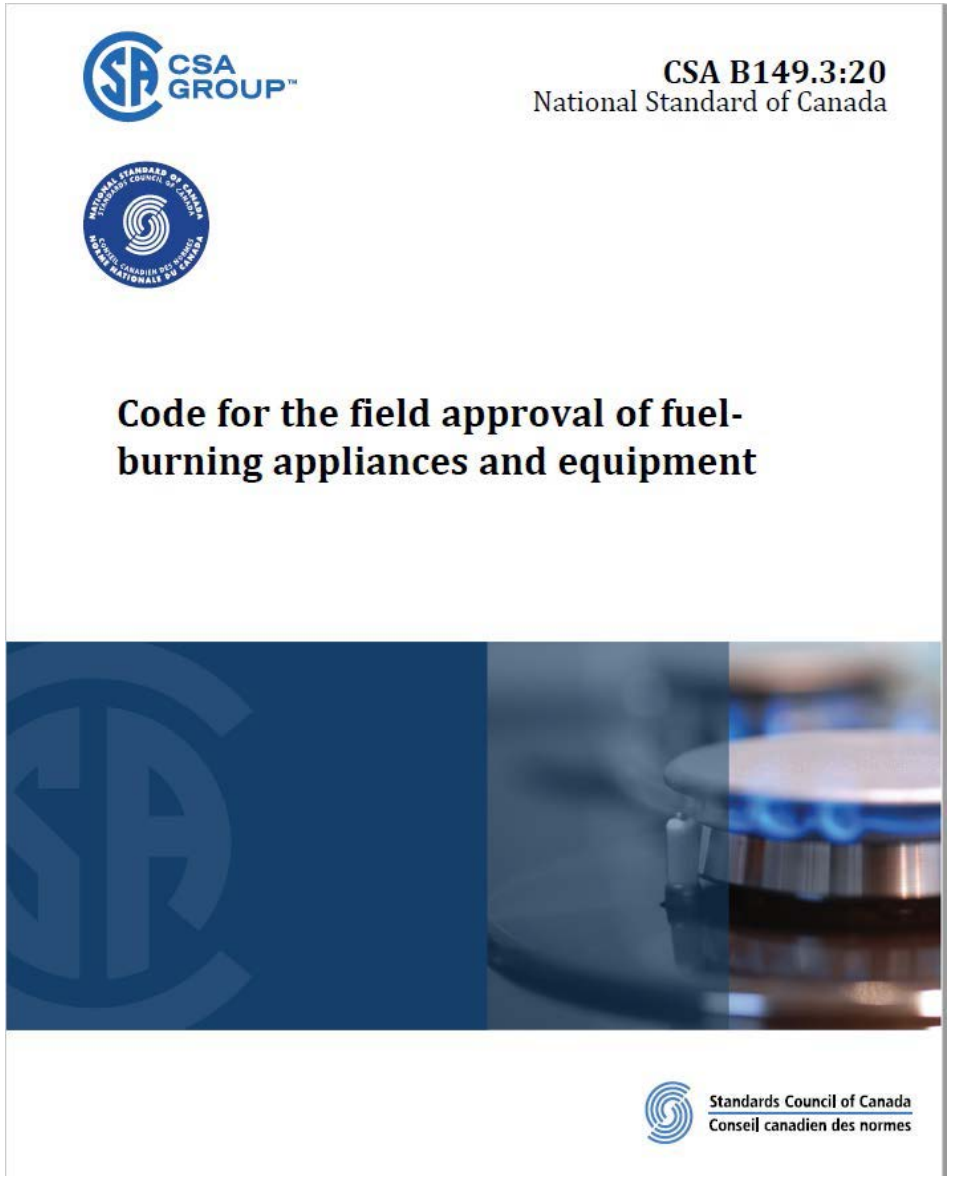
(2015) 4.8.1

Annex E is adopted in Saskatchewan as mandatory requirements for flare pilot systems in accordance with clause 4.8.



This Section can only be used with prior approval of Gas Inspections on equipment that cannot be evaluated otherwise.

19 Appliances in a Complex and Integrated Facility *(New Section)*



20 Additional Requirements for Portable Appliances and Equipment *(New Section)*

B149.3-20 – Field Approval of Fuel-Burning Appliances – Additional Requirements for Portable Appliances and Equipment

(new clauses)

20.1 Portable appliances and portable equipment shall be approved [see Annex J for guidelines on mobile food service equipment (food trucks)].

20.2 Portable appliances and portable equipment shall be clearly marked as being portable.

20.3.1 Instructions for (re)-assembly, commissioning, operation, decommissioning, disassembly, and transportation of the portable appliance and portable equipment shall be approved.

20.3.2 A checklist for the activities listed in Clause 20.3.1 shall

a) be created;

b) be dated and completed each time the portable appliance or portable equipment is relocated;

c) identify the person(s) performing the work; and

d) be kept with the portable appliance or portable equipment.

20.4 A portable appliance or portable equipment shall not be used in one location longer than the approved time period.

20.5 Vent lines such as those from vent valves, relief valves, regulator vents, pressure limit sensors, or other controls shall be an integral part of the portable appliance or portable equipment, or shall be field installed in accordance with CSA B149.1.

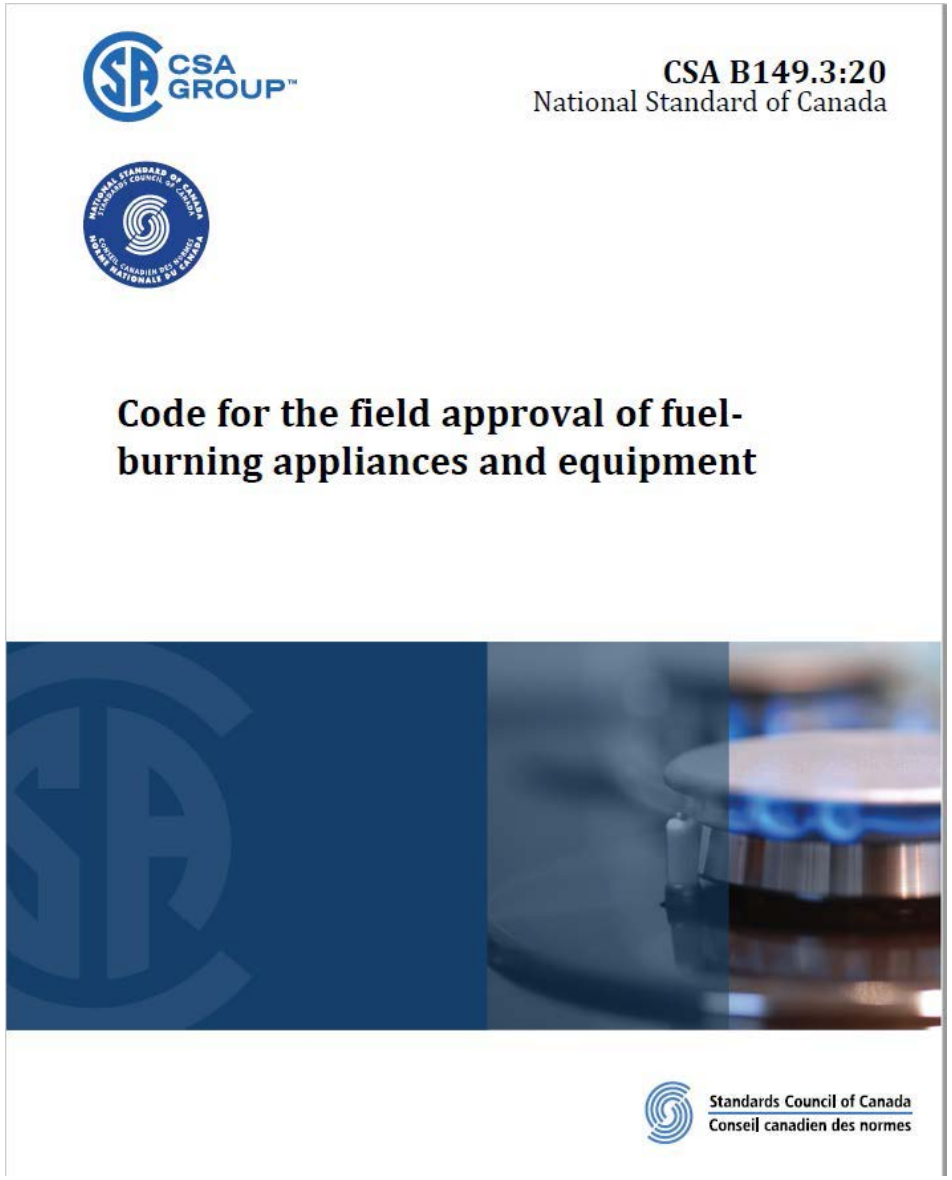
Technical Safety Authority of Saskatchewan

B149.3-20 – Field Approval of Fuel-Burning Appliances – Additional Requirements for Portable Appliances and Equipment

New SCOP 18.1.2.1

A flare, or combustor, or thermal oxidizer, or incinerator, designed for the elimination of a waste gas, which does so without a pilot, does not fall under the jurisdiction of Gas Inspections. No field approval, permit, or inspection of a pilotless combustor will be required through TSASK Gas Inspections.

Note: A combustor with a slipstream pilot (where a utility gas, such as propane or natural gas, is introduced into the main waste gas stream to facilitate reliable combustion) is nonetheless a pilot, and is therefore subject to the same requirements of field approval meeting B149.3, gas permit as an appliance, and all resulting inspections, as a combustor pilot which is separated in whole or in part from the main waste gas stream.


CSA GROUP
CSA B149.3:20
National Standard of Canada
Code for the field approval of fuel-burning appliances and equipment
Standards Council of Canada
Conseil canadien des normes

Annexes

B149.3-20 – Field Approval of Fuel-Burning Appliances – Annexes

The following Annexes have been renumbered:

Annex E - **Flare Pilots** was moved to Section 18.

Annex F - **Guidelines for valve proving systems** becomes **Annex E**.

Annex G - **Requirements for use of oxygen in combustion systems** becomes **Annex F**.

Annex H - **Liquid fuels** becomes **Annex G**.

Annex I - **Solid fuels** becomes **Annex H**.

B149.3-20 – Field Approval of Fuel-Burning Appliances – Annexes

The following new Annexes have been added:

Annex I - **Risk-based program for determining requirements for an appliance in a complex and integrated facility**.

This non-mandatory Annex can only be used with prior approval of Gas Inspections on equipment that cannot be evaluated otherwise.

Annex J - **Mobile outdoor food service unit**.

To provide compiled requirements for food trucks from various codes

Annex K - **Recommended requirements for automatic safety shutoff valves and automatic vent valves installed on gas turbines having capacities greater than 12.5 MMBtu/h (3.66 MW) and inlet pressures greater than 150 psi**.

See clause 17.3.5

B149.3-20 – Field Approval of Fuel-Burning Appliances – Annex J

New SCOP to Annex J Mobile outdoor food service unit

J.1.1 Annex J of CSA B149.3-20 is adopted in Saskatchewan as mandatory for inspections of mobile outdoor food service units.

J.5.4 Gas cooking appliances shall be mounted to a mobile food service unit in accordance with J.5.3 and shall be connected by a gas connector that is certified to ANSI Z21.69/CSA 6.16.

These gas connectors required on all gas appliances in a commercial kitchen are also required on gas appliances in a commercial food truck.

Thank you for reviewing the first section of this presentation of the substantial changes to B149.3-20

and the resulting changes to the Saskatchewan Code of Practice to CSA B149.3-20

The next section of this presentation provides changes to the Saskatchewan Code of Practice to CSA B149.3-20 resulting from recent experiences.

B149.3-20 Field Approval of Fuel-Burning Appliances

THE·SASKATCHEWAN¶
CODES·OF·PRACTICE¶
GAS·INSTALLATION·SUPPLEMENT¶
CSA-B149.3·-·20¶
CODE·FOR·THE·FIELD·APPROVAL¶
OF·FUEL-BURNING¶
APPLIANCES·AND·EQUIPMENT¶
¶
Section Break (Next Page)

January·1,·2021¶

Saskatchewan Codes of Practice 2020

B149.3-20 – Field Approval of Fuel-Burning Appliances – Applications

10.6.10.2

In a plant environment, where a relief valve terminates into a common flare header, a locked-open, or sealed-open, full port manual valve may be used to isolate the operational flare header from a relief valve discharge for maintenance purposes of the equipment under the protection of the relief valve. In this situation, the TSASK Pressure Relief Path (PRP) Stop Valve Control Program may be utilized. The requirements for application and the PRP Stop Valve Control program manual are available from TSASK Boiler and Pressure Vessel.

B149.3-20 – Field Approval of Fuel-Burning Appliances – Safety Controls

12.3.1 *(new SCOP)*

Where the Low-Fire start required in clause 12.3 is accomplished by means of a separate Low-Fire valve train, the Low-Fire valve train shall meet the requirements for a pilot valve train.

Technical Safety Authority of Saskatchewan

Thank you for reviewing this presentation of the substantial changes to B149.3-20 and the changes to the Saskatchewan Code of Practice to CSA B149.3-20

If you have any questions, please ask. 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.