Canadian Gas Technician - Learning Module 21

Codes, Standards, and Regulations

A comprehensive guide to navigating Canada's regulatory framework for gas installations, ensuring safety, compliance, and professional excellence.

Learning Objectives

Upon completion of this chapter, students will be able to:

01

Navigate the Canadian regulatory framework for gas installations

02

Apply CSA B149.1 Natural Gas and Propane Installation Code requirements

03

Implement CSA B149.2 Propane Storage and Handling Code provisions

04

Understand vehicle propane system requirements under CSA B149.5

05

Integrate National Building Code requirements with gas codes

Learning Objectives (Continued)

01

Apply Canadian Electrical Code requirements for gas installations

02

Reference other relevant standards appropriately

03

Complete permit and inspection requirements properly

04

Understand liability and insurance requirements for gas contractors

05

Maintain current knowledge of codes and regulations

Chapter 21.1

Canadian Regulatory Framework

Canada's gas safety regulatory system involves multiple levels of government and enforcement authorities.

Overview of Regulatory Structure

The Canadian regulatory framework operates through federal, provincial, and municipal jurisdictions with specific responsibilities at each level.

Hierarchy of Regulations

Federal Level

- Sets national standards through CSA
- Regulates interprovincial pipelines
- Transportation of Dangerous Goods (TDG)
- National Building Code (model)
- National Energy Board oversight

Provincial Level

- Adopts and enforces codes
- Licensing and certification
- Safety authorities (TSSA, etc.)
- Provincial amendments
- Inspection programs

Municipal Level

- Permit issuance
- Local bylaws
- Additional requirements
- Zoning restrictions
- Business licensing

Legal Authority

Level	Authority Source
Federal	Constitution Act, various acts
Provincial	Provincial legislation
Municipal	Provincial delegation
Safety Authorities	Provincial designation

Federal Regulations

Federal involvement focuses on standards development and interprovincial matters.

Standards Development

Canadian Standards Association (CSA):

- Develops national standards
- Technical committees
- Public review process
- Consensus-based
- Regular updates

Key Federal Acts

Act	Application
Canada Labour Code	Federal workplaces
Transportation of Dangerous Goods Act	Cylinder transport
National Energy Board Act	Interprovincial pipelines
Hazardous Products Act	Equipment approval

Federal Standards

Key Standards:

- CSA B149 series
- CSA B51 (Boilers)
- CSA B52 (Mechanical Refrigeration)
- CSA Z662 (Oil and Gas Pipeline)
- CAN/ULC standards

Transport Canada:

- DOT cylinder specifications
- Transportation requirements
- Driver certification
- Vehicle requirements
- Documentation

Natural Resources Canada

Energy efficiency standards

Setting national benchmarks for equipment performance

EnerGuide ratings

Consumer information on energy consumption

Equipment testing

Verification of performance claims

Rebate programs

Financial incentives for efficiency

Research initiatives

Advancing gas technology and safety

Provincial Regulations by Province

Each province has unique regulatory structures and requirements.

Ontario

Technical Standards and Safety Authority (TSSA):

Responsibilities:

- Code adoption and enforcement
- Licensing and certification
- Inspections
- Incident investigation
- Public safety

Ontario Regulations

Regulation	Coverage
O. Reg 212/01	Gaseous Fuels
O. Reg 215/01	Fuel Oil
O. Reg 220/01	Boilers and Pressure Vessels
O. Reg 209/01	Operating Engineers

Ontario Licensing Requirements

G3

Appliances up to 400,000 BTU/hr

G2

Any size appliance

G1

All work including industrial

GP

Propane specific

OBT

Oil burner technician

British Columbia

BC Safety Authority (Technical Safety BC):

Structure:

- Independent authority
- Provincial mandate
- Fee-based services
- Industry oversight
- Public safety focus

Gas Safety Regulation:

- Based on CSA B149.1
- Provincial amendments
- Permit requirements
- Contractor licensing
- Installation standards

BC Certification Levels

Class	Scope
Class B	Residential/commercial
Class A	All gas work
Class B Fitter	Under supervision
Class A Fitter	Installation/maintenance

Alberta

Alberta Municipal Affairs:

Safety Codes Act:

- Comprehensive safety legislation
- Permits and inspections
- Certification requirements
- Discipline process
- Appeals mechanism

ABSA (Pressure Equipment):

- Boiler and pressure vessel
- Power engineers
- Pressure welders
- Quality programs
- Design registration

Alberta Certification

Gasfitter Level 1

(Apprentice)

Gasfitter Level 2

(Journeyman)

Sheet Metal Worker

Refrigeration Mechanic

Quebec

Régie du bâtiment du Québec (RBQ):

Unique Aspects:

- French language requirements
- Quebec Construction Code
- Different trade structure
- Licence requirements
- Competency cards

Quebec Gas Licensing

License	Work Authorized
TAG-1	Residential gas
TAG-2	Commercial gas
TAG-3	Industrial gas
15.4	Gas contractor

Other Requirements:

- CCQ membership
- French proficiency
- Quebec-specific training
- Insurance requirements
- Business registration

Atlantic Provinces

Nova Scotia:

- Labour and Advanced Education
- Gas Fitter Class 1, 2, 3
- Mandatory certification
- Red Seal recognition

New Brunswick:

- Public Safety Division
- Plumbing Installation and Inspection Act
- Combined plumbing/gas
- Certification levels

Prince Edward Island:

- Office of the Fire Marshal
- Limited gas work
- Propane focus
- Small market

Newfoundland and Labrador:

- Service NL
- Government Services
- Similar to Nova Scotia
- Remote challenges

Prairie Provinces

Manitoba:

- Office of the Fire Commissioner
- Manitoba Hydro involvement
- Certification requirements
- Inspection programs

Saskatchewan:

- TSASK (Technical Safety Authority)
- Gas Licensing Act
- Similar to Alberta
- Agricultural exemptions

Territories

Common Characteristics:

- Smaller markets
- Limited authorities
- Federal involvement
- Unique challenges
- Adapted requirements

Regulatory Adaptations for Territories

Remote locations

Challenges in accessing services and materials

Extreme weather

Special considerations for harsh climates

Limited resources

Fewer inspectors and enforcement personnel

Cultural considerations

Indigenous communities and traditional practices

Federal partnerships

Collaboration with federal authorities

Municipal Bylaws

Municipalities add local requirements beyond provincial regulations.

Typical Municipal Requirements

Permit Requirements:

- Building permits
- Gas permits
- Plumbing permits
- Electrical permits
- Business licenses

Additional Municipal Restrictions

Area	Common Restrictions
Zoning	Equipment locations
Noise	Operating hours
Aesthetics	Screening requirements
Heritage	Special districts
Environmental	Emission limits

Municipal Fees and Charges

Permit fees

Initial authorization costs

Inspection fees

Verification visit charges

Re-inspection charges

Additional visits for corrections

Plan review fees

Technical document examination

Development charges

Infrastructure contribution fees

Local Variations - Major Cities

Toronto

- Additional inspections
- Certified installer program
- High-rise requirements
- District heating rules

Vancouver

- Seismic requirements
- Energy efficiency
- Green building standards
- Rainwater protection

Calgary

- Separate gas permits
- Quality Management Plan
- Safety Codes Officers
- Electronic permitting

Montreal

- French documentation
- RBQ coordination
- Borough variations
- Historic preservation

Enforcement Authorities

Various authorities enforce gas safety regulations.

TSSA and Provincial Equivalents

Technical Standards and Safety Authority (Ontario):

Structure:

- Not-for-profit corporation
- Delegated authority
- Self-funded
- Industry boards
- Public accountability

TSSA Programs

Program	Coverage
Fuels Safety	Natural gas, propane, fuel oil
Boilers/Pressure Vessels	BPV equipment
Operating Engineers	Power engineers
Elevating Devices	Elevators, escalators
Amusement Devices	Rides, inflatables

Enforcement Tools

Licensing suspension/revocation

Removing authority to work

Orders and directives

Mandatory compliance actions

Prosecution

Legal action for violations

Administrative penalties

Financial consequences

Public notification

Disclosure of violations

Provincial Safety Authorities

Technical Safety BC:

Services:

- Permits and licensing
- Inspections
- Incident investigations
- Education programs
- Standards development

Enforcement:

- Compliance orders
- Monetary penalties
- License actions
- Prosecution
- Equipment orders

TSASK (Saskatchewan):

Unique Features:

- Crown corporation
- Industry governance
- Quality programs
- Risk-based inspection
- Technology adoption

AER (Alberta Energy Regulator):

Scope:

- Oil and gas facilities
- Pipeline safety
- Well sites
- Processing plants
- Environmental protection

Inspection Programs

Risk-Based Inspection

Risk Level	Inspection Frequency
High	Annual or more
Medium	Every 2-3 years
Low	Every 3-5 years
Periodic	Random selection

Inspection Types

Initial installation

New system verification

Periodic safety

Regular scheduled checks

Incident follow-up

Post-accident investigation

Complaint-based

Response to concerns

Audit inspections

Comprehensive review

Inspector Powers

- **Enter premises**
  Access to inspect installations
- **Examine equipment**
  Physical inspection of systems
- **Request documentation**
  Review permits and records
- **Issue orders**
  Mandate corrective actions
- **Stop work**
  Halt unsafe operations
- **Seize evidence**
  Collect materials for investigation

Compliance and Enforcement

Progressive Enforcement

Education and warning

Initial guidance for minor issues

Compliance order

Formal directive to correct

Administrative penalty

Financial consequences

License action

Suspension or revocation

Prosecution

Legal proceedings

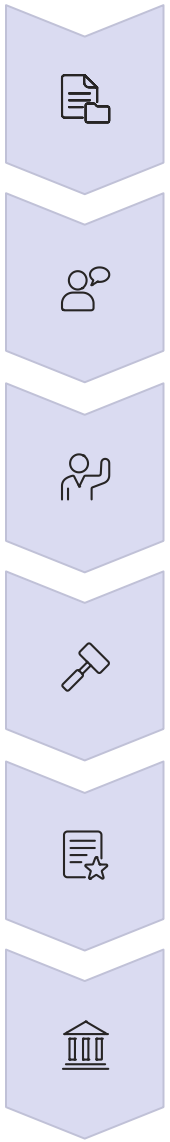
Public notification

Disclosure of violations

Penalties

Violation	Typical Penalty
No permit	$200-1,000
Unlicensed work	$500-5,000
Safety violation	$1,000-10,000
Repeat offense	Double penalties
Corporate	Up to $500,000

Due Process



Notice of violation

Opportunity to respond

Appeal rights

Hearing process

Review procedures

Court appeals

Chapter 21.2

CSA B149.1 - Natural Gas and Propane Installation Code

The primary code governing gas installations in Canada.

Scope and Application

Understanding where and how the code applies.

Code Coverage

Included:

- Natural gas installations
- Propane installations
- Piping systems
- Appliances
- Venting systems
- Controls and safety devices

Excluded:

- Pipelines (CSA Z662)
- Portable camping equipment
- Manufacturing processes
- Refineries
- Marine installations
- Aircraft systems

Application by System Component

System Component	Code Section
Piping	Section 5
Appliances	Section 7
Venting	Section 8
Air supply	Section 9
Exhaust	Section 10

Adoption Process

Provincial Adoption

01

Review by authorities

02

Stakeholder consultation

03

Provincial amendments

04

Regulatory approval

05

Implementation date

06

Transition period

Amendments:

- Local conditions
- Provincial laws
- Unique hazards
- Industry practices
- Safety improvements

Key Definitions

Critical terms for code interpretation.

Essential Definitions

> **Appliance:** "A device to convert gas to energy and includes all components, controls, wiring, and piping required as part of the device."

> **Authority Having Jurisdiction (AHJ):** "The governmental body responsible for the enforcement of any part of this Code or the official or agency designated by that body."

> **Approved:** "Approved by the authority having jurisdiction."

> **BTU (British Thermal Unit):** "The amount of heat required to raise the temperature of 1 pound of water 1°F."

Categories of Appliances

Category	Description
I	Non-condensing, negative draft
II	Non-condensing, non-positive
III	Non-condensing, positive pressure
IV	Condensing, positive pressure

Important Terms

Combustion Air

"Air required for complete combustion of gas."

Dilution Air

"Air that enters a draft hood or draft regulator and mixes with flue gases."

Excess Air

"Air supplied beyond that required for complete combustion."

Readily Accessible

"Having access without requiring the removal of any panel, door, or similar obstruction and without the use of portable ladders, chairs, etc."

Safety Shut-Off Valve

"A valve that automatically shuts off the gas supply to the main burner and pilot burner, if applicable."

General Requirements

Overarching principles governing all installations.

Fundamental Requirements

Workmanship:

- Industry-accepted practices
- Manufacturer instructions
- Neat and professional
- Proper materials
- Correct tools

Materials and Equipment:

- Approved/certified products
- Suitable for application
- New or reconditioned
- Properly rated
- Compatible materials

Protection Requirements

Requirement	Application
Mechanical	Physical damage prevention
Corrosion	Suitable materials/coatings
Electrical	Bonding and grounding
Environmental	Weather protection

Clearances:

- Manufacturer specifications
- Code minimums
- Heat protection
- Service access
- Combustion air

Installation Requirements by Section

Detailed requirements for system components.

Section 5: Piping and Tubing

Material Requirements

Material	Application
Steel pipe	All locations
Copper tube	Specific conditions
CSST	With restrictions
PE pipe	Underground only
Stainless steel	Special applications

Piping Sizing and Installation

Sizing Requirements:

- Use code tables
- Longest run method
- Pressure drop limits
- Specific gravity correction
- Future load consideration

Installation:

- Proper support spacing
- Protection from damage
- Corrosion prevention
- Electrical isolation
- Expansion provisions

Section 6: Meters and Service Regulators

Meter Installation:

- Accessible location
- Support requirements
- Clearances
- Protection
- Venting

Regulator Requirements:

- Proper sizing
- Vent termination
- Relief protection
- Access
- Identification

Section 7: Appliance Installation

General Installation

01

Manufacturer instructions

02

Clearances to combustibles

03

Level and secure

04

Proper connections

05

Controls accessible

06

Safety devices functional

Specific Appliance Requirements

Appliance Type	Key Requirements
Furnaces	Return air, filters, access
Water heaters	T&P valve, drain, access
Boilers	ASME rated, relief valve
Ranges	Anti-tip, ventilation
Dryers	Exhaust, make-up air

Section 8: Venting

Venting Principles

Natural draft

Buoyancy-driven exhaust

Mechanical draft

Fan-assisted venting

Direct vent

Sealed combustion systems

Condensing systems

High-efficiency venting

Power venting

Forced exhaust systems

Venting Tables

Available Tables:

- Table 8.2: Type B Gas Vent
- Table 8.3: Masonry Chimney
- Table 8.4: Single Wall
- Table 8.5: Connectors
- Table 8.6: Exterior Masonry

Common Requirements:

- Minimum height
- Maximum length
- Clearances
- Termination
- Support

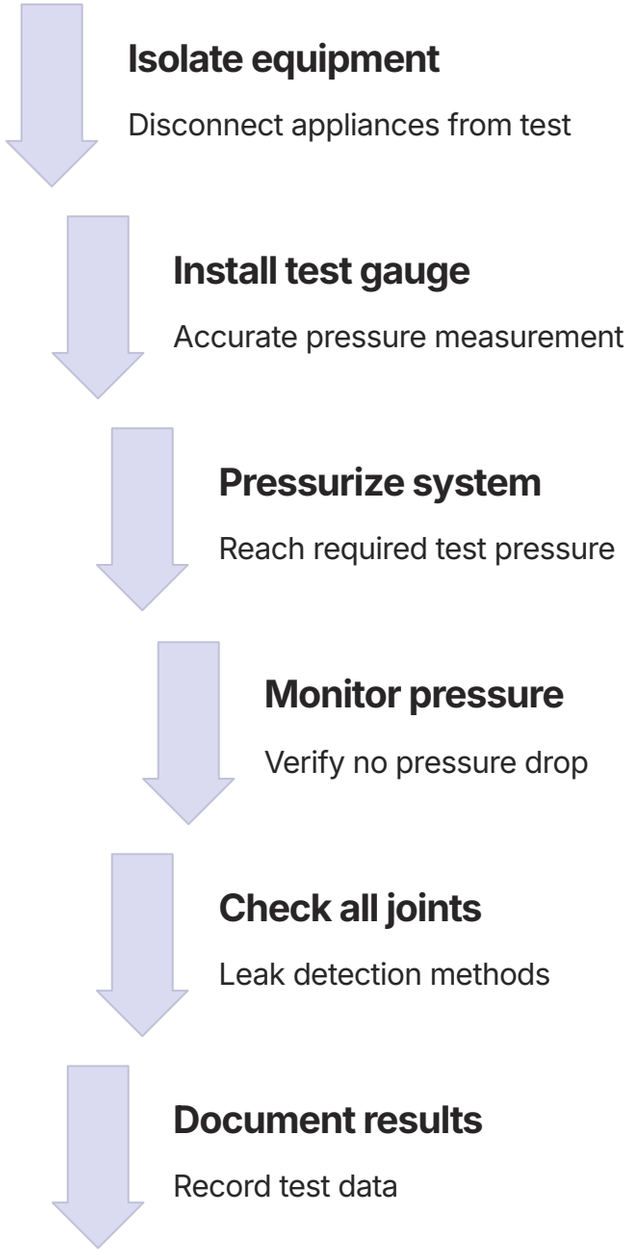
Testing and Purging Requirements

Ensuring system integrity and safety.

Pressure Testing

System Pressure	Test Pressure	Duration
≤0.5 psig	1.5× operating (min 3 psig)	10 min
>0.5 psig	1.5× operating (min 10 psig)	10 min
>125 psig	1.25× operating	24 hours

Test Procedure



Isolate equipment

Disconnect appliances from test

Install test gauge

Accurate pressure measurement

Pressurize system

Reach required test pressure

Monitor pressure

Verify no pressure drop

Check all joints

Leak detection methods

Document results

Record test data

Acceptable Test Media

Air

Most common test medium

Nitrogen

Inert gas option

Carbon dioxide

Alternative inert gas

Inert gas

Safe testing medium

NEVER use oxygen for pressure testing - extreme fire hazard!

Purging Requirements

Into Service:

1. Verify test complete
2. Connect at meter
3. Purge air from system
4. Light pilots
5. Check operation
6. Leak check

Out of Service:

1. Close gas supply
2. Disconnect at meter
3. Purge gas out
4. Cap all openings
5. Tag system

Safety Requirements:

- Outdoor discharge
- No ignition sources
- Controlled release
- Proper ventilation
- Monitoring

Using Code Tables

Proper use of sizing and venting tables.

Pipe Sizing Tables

Table 5.1 - Natural Gas

How to Use:

01

Determine total load

02

Measure longest run

03

Find pressure drop

04

Select pipe size

05

Verify velocity

Pipe Sizing Example and Corrections

Example:

- Load: 200,000 BTU/hr = 200 CFH
- Length: 100 feet
- Pressure: 7" W.C.
- Size from table: 1" pipe

Corrections:

- Specific gravity
- Temperature
- Altitude
- Fittings

Venting Tables

Table 8.2 Application

01

Identify appliance category

02

Find BTU input

03

Determine vent height

04

Check lateral length

05

Select vent size

Multiple Appliances:

- Common venting rules
- Combined capacity
- Connector sizing
- Maximum/minimum
- Special cases

Updates and Amendments

Keeping current with code changes.

Update Cycle

CSA Process:

- 5-year review cycle
- Technical committee
- Public review
- Comment resolution
- Publication

Major Updates:

Edition	Key Changes
2015	CSST bonding, venting updates
2018	Condensing appliances, controls
2020	Electronic submissions, new materials
2025	Hydrogen provisions, efficiency