TECHNICAL SAFETY BC

SAFETY ORDER

DELAYED IGNITION - CATEGORY IV GAS BOILERS

Date of Issue: October 1, 2026 **No: SO-GA 2026-01**

This safety order is issued pursuant to section 31 of the Safety Standards Act (British Columbia) (the **"Act"**).

Failure to comply with a safety order is an offence under section 72 of the Act.

Part 1: Details of Regulated Work or Regulated Product

This safety order is being issued in relation to hazardous conditions identified following numerous incident notifications beginning in 2020 regarding carbon monoxide (**"CO"**) releases into occupied spaces, including schools, residences, and care homes.

These incidents have been linked to delayed ignition events causing venting components to dislodge on gas-fired Category IV* low pressure hot water boilers certified to CSA 4.9 utilizing direct-spark ignition of the main burner(s). Such incidents have not been limited to specific boiler manufacturers or certification bodies.

** Category IV gas appliances operate with a positive vent pressure and a vent gas temperature capable of causing condensate production in the vent*

This safety order is effective immediately and is issued to:

- owners and operators of Category IV direct spark ignition gas-fired boilers certified to the CSA 4.9 Gas-fired low-pressure steam and hot water boilers standard; and
- licensed gas contractors and certified gas fitters.

Part 2: Requirement(s) of Safety Order

2.1 Technical Requirements

The following requirements apply to Category IV low-pressure hot water boilers certified to CSA 4.9 that utilize direct-spark ignition of the main burner(s) (the **"Boiler"**):

1. The Boiler must be inspected and serviced at least once every twelve (12) months, or more frequently where required by the manufacturer, and must be maintained in accordance with all applicable manufacturer instructions, bulletins, notices, specifications, and this safety order. Additional information regarding servicing of gas appliances is provided in Information Bulletin: Annual Servicing for Gas Appliances.
2. Combustion, ignition, safety control, and gas supply systems must be serviced, tested, maintained, and verified to operate as intended to minimize the likelihood of delayed ignition.
3. The venting system, including all vent supports, joints, adapters, and boiler-to-vent connections, must be inspected and maintained to ensure adequate support, proper arrangement, and structural integrity to minimize the potential for damage or loss of containment resulting from delayed ignition.
4. Where damage, deterioration, venting failure, delayed ignition, or any other condition affecting the safe operation of the Boiler or its venting system is identified, the Boiler must not be returned to operation until:

a. the condition and its underlying cause have been corrected; and
b. the Boiler and complete venting system have been inspected, tested, and repaired as necessary to confirm safe operation and proper discharge of combustion products.

5. Where a Boiler or associated venting system is found to be beyond repair or in an unsafe condition, the Boiler must be disconnected from the gas supply and rendered inoperable until repairs or replacement, as applicable, can be completed.
6. As the risk of delayed ignition and associated venting failure cannot be fully eliminated through inspection, servicing, and maintenance, carbon monoxide alarms or detectors are recommended as an additional protective measure to provide warning to occupants in the event of a carbon monoxide exposure.

   Where installed, carbon monoxide alarms or detectors should conform to the standards specified in section 6.9.3.1 of the BC Building Code, be installed and maintained in accordance with the manufacturer's instructions, and be located, at a minimum:

   a. within the mechanical room containing the Boiler; and
   b. for residential occupancies served by the Boiler, within or directly adjacent to each sleeping room or bed space, and no more than 5 m from it.

2.2 Responsibilities of Owners and Operators

Owners and operators of a Boiler subject to this safety order are responsible for:

1. Retaining a licensed gas contractor to inspect, service, test, maintain, and repair the Boiler and its venting system, as required, in accordance with section 2.1 of this safety order.
2. Maintaining records of inspections, servicing, testing, repairs, and other corrective actions associated with the Boiler and its venting system and providing those records to Technical Safety BC upon request.
3. Evaluating the CO alarm or detector recommendations in section 2.1 and determining their applicability to the building or occupancy.
4. Reporting incidents and hazards associated with the Boiler or its venting system to Technical Safety BC, including suspected or confirmed delayed ignition events, observed boiler damage, and/or CO exposure. Reporting must be completed in accordance with Technical Safety BC's Gas Incident and Hazard Reporting Information Bulletin.

2.3 Responsibilities of Licensed Gas Contractors and Certified Gas Fitters

Licensed gas contractors and certified gas fitters performing work on a Boiler subject to this safety order are responsible for:

1. Inspecting, servicing, testing, and, where necessary, repairing the Boiler and its venting system to ensure the applicable requirements of section 2.1 of this safety order are met.
2. Performing all regulated gas work in accordance with manufacturer's instructions, bulletins and notices, applicable codes, and regulatory requirements.
3. Investigating the underlying cause of any delayed ignition, abnormal combustion, ignition failure, venting failure or separation, or other condition affecting safe operation before returning the Boiler to service.
4. Documenting identified deficiencies and corrective actions, and advising the owner or operator of any conditions that may affect the safe operation of the Boiler or its venting system.

5. Where a Boiler cannot be returned to safe operation, isolating or otherwise prohibiting the use of the Boiler in accordance with section 2.1 of this safety order and promptly notifying a gas safety officer.
6. Reporting incidents and hazards identified in the course of their work to Technical Safety BC, including but not limited to, suspected or confirmed delayed ignition events, observed boiler damage, and carbon monoxide exposure. Reporting must be completed in accordance with Technical Safety BC's Gas Incident and Hazard Reporting Information Bulletin.

Part 3: Details of Issue

Delayed ignition events can be created when gas entering a combustion chamber is not initially ignited by the electronic ignition system at the beginning of its timed ignition sequence. The delay in ignition allows a greater volume of gas to accumulate, and when ignition then occurs, the combustion of the built-up gas creates a sudden high-pressure condition inside the combustion chamber and flue passages.

Delayed ignitions can occur due to a wide variety of reasons, including:

- Insufficient air supply or incorrect gas/air mixture
- Incorrect or fluctuating gas , supply pressure or volume
- Incorrect ignitor gap or spark location and strength
- Incorrect electrical supply or polarity
- Poor/faulty electrical connections
- Dirty/plugged burner mesh
- Dirty/plugged heat exchanger

While the equipment product standard includes requirements for ignition sequences, recent incident investigations into venting system damage or separation have revealed that commonly used system configurations are not capable of withstanding the pressure spikes associated with some delayed ignition events. These delayed ignition events can damage or dislodge vents from the appliance and may cause the separation of gasketed vent joints. In such cases, allowing continued boiler operation may result in the creation of serious hazards, such as toxic CO exposure, interior moisture causing mould and rot, and fire hazards.

Licensed gas contractors are reminded that proper servicing of a Boiler includes the servicing of the Boiler's attached venting system.

For more detailed information regarding Technical Safety BC's investigation into these carbon monoxide release events see Incident Investigation Report: Carbon Monoxide Release from Boiler Exhaust Venting.

Part 4: Details of Ordering Safety Manager or Safety Officer

I certify that I am authorized to issue this safety order in accordance with section 15 (d) of the Act.

Provincial Safety Manager - Gas **Date: October 1, 2026**

Failure to comply with this safety order is considered as an offence under section 72 of the Act and may result in further enforcement actions including compliance order, monetary penalty, or discipline order.

A person affected by this safety order may appeal this order in writing to the Safety Standards Appeal Board within 30 days. The appeal process is set out on the Safety Standards Appeal Board's website.

Safety Standards Act:

Safety Orders

31 (1) To prevent, avoid or reduce risk of personal injury or damage to property, a provincial safety manager may, in writing, issue a safety order.

(2) A safety order may be issued to any person in relation to any of the following:

(a) regulated work or regulated products generally;

(b) a specific class of regulated product or regulated work;

(c) a specific regulated product or regulated work.

(3) For certainty, a safety order issued under this section may apply to

(a) regulated work that meets the requirements under this Act,

(b) regulated work that previously met the requirements under this Act or a former Act but does not meet the current requirements under this Act,

(c) regulated products that meet the requirements under this Act, or

(d) regulated products that previously met the requirements under this Act or a former Act but do not meet the current requirements under this Act, including a regulated product that bears a certification mark.

(4) A safety order may specify any requirement that is intended to prevent, avoid or reduce the risk of personal injury or damage to property and may include any of the following orders:

(a) that an existing regulated work or regulated product must be made safe in compliance with the safety order;

(b) that a regulated product must be

(i) disconnected from a power source,

(ii) uninstalled, or

(iii) modified before continued use;

(c) that a regulated product must be operated, installed, manufactured or disposed of only as specified or that a regulated product must not be moved;

(d) that current or future regulated work or a regulated product must conform to the terms or conditions of the order;

(e) that a person take or refrain from taking any action that a safety manager considers necessary to prevent, avoid or reduce a risk of personal injury to persons or damage to property;

(f) that the manufacturer make reasonable efforts to recall the regulated product.

(5) The provincial safety manager must give written notice of the safety order to the following persons:

(a) the manufacturer of the regulated product;

(b) an owner of the regulated product if the identity of the owner is known to the provincial safety manager;

(c) the person in charge of the regulated work.

(6) The notice must state the reasons for the decision and that the person has the right to appeal the decision to the appeal board.

(7) Despite section 54, a safety order may not be stayed during an appeal.

References:

Safety Standards Act, SBC 2003, c. 39