

CAN/ULC-S605:2016

STANDARD FOR GAS VENTS

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Approved by:



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STANDARD FOR GAS VENTS

PREFACE

This is the Fourth Edition of the Standard for Gas Vents, CAN/ULC-S605.

This Edition of the Standard has been formally approved by the ULC Standards Committee on Factory-Built Fireplaces, Chimneys and Vents.

This Standard has been developed in compliance with the requirements of SCC for accreditation of a Standards Development Organization.

Only metric SI units of measurement are used in this Standard. If a value for measurement is followed by a value in other units in parentheses, the second value may be approximate. The first stated value is the requirement.

In Canada, there are two official languages, English and French. All safety warnings must be in French and English. Attention is drawn to the possibility that some Canadian authorities may require additional markings and/or installation instructions to be in both official languages.

This Fourth Edition National Standard of Canada is based on, and now supersedes, the Third Edition.

Attention is drawn to the possibility that some of the elements of this Canadian standard may be the subject of patent rights. ULC Standards shall not be held responsible for identifying any or all such patent rights.

Requests for interpretation of this Standard should be sent to ULC Standards. The requests should be worded in such a manner as to permit a “yes” or “no” answer based on the literal text of the requirement concerned.

The review and action to revise or reaffirm this Standard will not exceed 5 years from the date of publication, unless the Standard is identified as fitting within a stabilized category, whereby the review will commence within the appropriate time frame set out by ULC Standards.

This Standard is intended to be used for conformity assessment.

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1 SCOPE

1.1 The requirements of this Standard cover the design and construction of Type B (round or oval) and Type BW Gas Vents.

1.2 Type B Gas Vents are intended for the venting of flue gases having temperatures not exceeding 245 °C, from gas fired appliances certified with draft hoods or diverters. Type B Gas Vents are also intended for use with gas fired appliances, without draft hoods or diverters, which meet all of the following requirements:

- A The appliance is certified for use with a Type B Gas Vent;
- B Flue gas temperatures normally exceed 135 °C but do not exceed 245 °C;
- C The vent normally operates below atmospheric pressure; and
- D Condensation of flue gas products is not normally expected within the vent.

1.3 Type BW Gas Vents are intended for the venting of flue gases from recessed gas fired wall furnaces. The maximum input to a Type BW Gas Vent is determined by the maximum input of the vented wall furnace to which the Type BW Vent is intended to be connected.

1.4 Gas vents are intended for installation in accordance with the National Building Code of Canada and the Natural Gas and Propane Installation Code, CSA B149.1, or the acts or regulations of the authority having jurisdiction. They are intended primarily for installation inside buildings to provide an essentially vertical conduit or passageway for conveying flue gases to the outer air from the above described class of appliances. They may be used on the exterior of buildings when enclosed and specifically tested for such an application.

2 REFERENCE PUBLICATIONS

2.1 The documents shown below are referenced in the text of this Standard. Unless otherwise stated elsewhere in this Standard such reference shall be considered to indicate the edition and/or revisions of the document available at the date on which the Committee approved this ULC Standard.

Documents Published by the American Society for Testing and Materials (ASTM International)
100 Barr Harbour Drive, PO Box C700, West Conshohocken, PA 19428-2959 U.S.A.
Telephone: (610) 832-9585
www.astm.org

- ANSI/ASTM A653/A653M-15, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot Dip Process

Documents Published by CSA Group
178 Rexdale Blvd., Toronto, ON M9W 1R3
Telephone: 1-800-463-6727
www.csagroup.org

- CSA B149.1-15, Natural Gas and Propane Installation Code
 - CSA C22.2 No. 0.15-15, Adhesive Labels
-

Documents Published by the National Research Council of Canada
Institute for Research in Construction, Ottawa, ON K1A 0R6
Telephone: (613) 993-2463, Canada, 1-800-672-7990

- National Building Code Canada, 2015

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3 CONSTRUCTION

3.1 DEFINITIONS

3.1.1 The definitions contained in the Natural Gas and Propane Installation Code, CSA B149.1 shall apply throughout this Standard.

3.2 MATERIALS

3.2.1 Each gas vent component shall be made of non-combustible corrosion-resistant materials. Materials employed in the construction shall be of such quality and shall possess properties and characteristics, which may be expected to provide the almost unlimited service life expected of a permanent portion of a building. Metals shall not be used in combinations such as to cause detrimental galvanic action, which will adversely affect any part of the assembly.

3.2.2 The minimum thickness of sheet metal, including any coatings, shall, unless otherwise specified, be as follows:

Aluminum Alloys (1100, 3003) — inner pipe	0.30 mm
Aluminum Alloys (1100, 3003) — other use	0.40 mm
Uncoated Steel	0.40 mm
Zinc-Coated Steel (Refer to Clause 3.2.7)	0.46 mm
Aluminum-Coated Steel (122 g/m ² and where the bond between the steel and the aluminum is an iron-aluminum alloy)	0.46 mm
Stainless Steel (Type 430)	0.30 mm

3.2.3 Aluminum alloys containing more than 1.0 % magnesium shall not be used if the reflectivity of the material is utilized to reduce fire hazard.

3.2.4 A flue gas conveying conduit shall be of a material having durability and resistance to corrosion and heat equivalent to that of Type 1100 aluminum, Type 430 stainless steel, cement asbestos, or porcelain coated steel conforming with the requirements contained herein. Other parts in contact with the flue gases or subject to condensation shall be of material having durability and resistance to corrosion and heat equivalent to Type 1100 aluminum or aluminum coated steel.

3.2.5 An outer casing or other structural part of any gas vents whose failure would cause the gas vent to collapse or fail, or which adjoins fire stopping, shall be made of material having durability and resistance to physical damage, corrosion and fire.

NOTE 1: Plain galvanized steel (Type Z275 as defined by ASTM A653/A653M), or Type 1100 aluminum ordinarily satisfies the requirements of Clause 3.2.5.

NOTE 2: A painted part made of steel not less than 1.35 mm thick, or of cast iron not less than 3.18 mm thick, and for use only in the interior of buildings is considered as having corrosion resistance equivalent to that required by Clause 3.2.5.

3.2.6 The cap and the outer casing of the section or sections of any gas vent extending above the roof line, or otherwise exposed to the outside, shall be fabricated from corrosion-resistant and weather-resistant materials. These materials shall conform to the requirements contained in Test No. 14 – Condensing Sulphur Dioxide, as described in Subsection 4.17

3.2.7 Except for binder materials, thermal insulation shall be non-combustible.

3.2.8 Thermal insulation shall comply with the following conditions when the gas vent is tested in accordance with the requirements in this standard:

- A The products resulting from the combustion or volatilization of any combustible binder shall be discharged to the gas vent terminus outside of the building;
- B Insulating material shall retain sufficient physical strength to remain in its intended position;
- C The thermal conductivity of insulating material shall not be significantly increased; and
- D Thermal insulation shall not show evidence of softening, melting, change in physical structure, or other evidence of failure.

3.2.9 Thermal insulation shall be adequately protected against contact with products of combustion.

3.2.10 Thermal insulation, which is not adequately self supporting, shall be securely applied to solid surfaces in a manner to prevent sagging. An adhesive or cement for attaching such material shall retain its adhesive qualities at any temperature the adhesive may attain when the gas vent is tested in accordance with the requirements in this standard and at - 18 °C.

3.2.11 A water absorbing insulating material shall not become wetted by condensation or rain if such wetting will depreciate its durability or insulating value.

3.3 ASSEMBLY

3.3.1 A vent shall consist of all the essential parts necessary for the proper installation of a complete vent. Each part or assembly shall be designed for ready attachment of one to the other without requiring alteration, cutting, threading, drilling, or similar task by the installer; except that a special assembly or part designed to be cut to length or to be fit by the installer may be provided if means, such as bolts or sheet metal screws, are furnished for readily joining any altered part to a companion part or assembly.

3.3.2 Two or more parts or subassemblies, which must bear a definite relationship to each other for proper and safe use, shall be arranged and constructed to permit them to be incorporated into the complete assembly, without need for alteration or alignment, only in the correct relationship with each other; or such parts or subassemblies shall be assembled and shipped from the factory as one element.

3.3.3 Each part (such as a vent section or length, a cap, firestop spacer, or support element, etc.) shall be completely assembled by the manufacturer at the factory.

3.3.4 A Type B gas vent shall be capable of ready attachment to appliance flue outlets. Means shall be provided to permit attachment to a standard size vent connector or draft hood.

3.3.5 A Type BW gas vent shall be capable of ready attachment to the steel header plate (vent support and flue collar) for vented wall furnaces illustrated by Figure 1.

3.3.6 A gas vent, when installed in accordance with the manufacturer's instructions, shall be positioned securely and resistant to damage from external forces.

3.3.7 The design of a gas vent part shall not void the firestopping required between spaces of a building when the part is installed in accordance with the instructions furnished by the manufacturer.

3.3.8 The annulus between any two walls of a multiple wall vent pipe section or vent pipe fitting shall be not less than 6.4 mm in width.

3.4 SIZE

3.4.1 A round gas vent pipe or fitting shall have an internal cross sectional area of not less than 4540 mm² (76 mm diameter pipe).

3.4.2 The internal dimension of the cross section of an oval or rectangular vent pipe or fitting measured across the minor axis shall be not less than 38 mm.

3.5 JOINTS

3.5.1 Parts of gas vents shall be joined and secured in a manner to prevent disengagement when tested in accordance with the requirements in this standard.

3.5.2 If screws are employed to field join assemblies, the assemblies to be joined shall readily receive screws without being field punched or drilled. Any such screw shall not extend into a flue gas passage. If cement is employed for this purpose, the cement shall be a quick drying type. Cement, screws, and instructions shall be furnished.

3.5.3 A joint, when made up in accordance with the manufacturer's instructions, shall be reasonably gas tight.

3.5.4 A joint shall not materially reduce the capacity of the vent piping.

3.5.5 A joint shall not retain condensation nor permit condensation to flow from the interior to the exterior of the flue gas conveying conduit.

3.5.6 The joints of portions of gas vents intended for exposure to the outside shall be designed to be resistant to the entry of rain.

3.6 SPACERS

3.6.1 A Type B and a Type BW gas vent for installation within a 38 mm by 89 mm or a 38 mm by 140 mm stud space, with other than zero clearance, shall be provided with ceiling plate spacers designed to locate the vent centrally in the stud space. Each length of pipe for such vents shall include integral spacers which will maintain the minimum required clearance between the pipe and the inner surfaces of walls. Such spacers shall be located so that, when lengths are joined, spacers will be directly adjacent to each joint, except that a Type BW for single storey installation only may be provided with a base plate in lieu of integral spacers when it is a single section.

3.6.2 A ceiling plate spacer, except the one to be installed at the lowest ceiling level with a Type BW vent, shall constitute a complete firestop.

3.6.3 All spacers shall have sufficient strength and bearing surface to maintain the required clearance from vent parts to joists, ceiling and floor material, and the inner surface of walls.

3.7 SUPPORTS

3.7.1 Gas vent assemblies designed for joist support shall be provided with a support assembly.

3.7.2 Gas vent assemblies designed for exterior installation shall be provided with both vertical and lateral support assemblies.

3.7.3 A support assembly shall be designed to establish and maintain the minimum required clearance between vent pipe and combustible construction. A support for installation in a joist area shall constitute a complete firestop, and shall locate at a safe distance the point at which a flue pipe may be connected as determined by test in accordance with the requirements in this standard.

3.7.4 A vertical support assembly shall be designed to sustain, without failure, a load equivalent to four times the force imposed upon it by all vent parts it is intended to support.

3.7.5 A support assembly intended to be secured by nails or screws shall be arranged so that such holding means will be loaded in shear.

3.7.6 A lateral support assembly shall be designed so that a supported vent is able to resist a horizontal load of 1.44 kN/m² applied in any direction without separation, sagging or other displacement or damage and without distortion or dislodgement of the supports.

3.8 FIRESTOP SPACERS

3.8.1 A gas vent intended to pass through a floor or ceiling of a building shall be provided with an assembly designed to provide one firestop above or below the framed joist opening and to establish and maintain required minimum clearances between vent sections and combustible construction in this area. Spacers shall have sufficient strength and bearing surface to maintain the required clearance from vent sections to the inner surface of joists, and ceiling or floor material.

3.8.2 The firestop shall be at least 25 mm greater on each side than the nominal joist opening. A spacer shall provide for substantial continuous interference with the framed joist opening for a height or depth of not less than 25 mm. A joint between factory-made parts, which provide for firestopping shall not have a through-opening greater than 3 mm wide.

3.9 RADIATION SHIELDS

3.9.1 A radiation shield, if provided to obtain safe temperatures on floor or ceiling structures, shall be an integral part of a firestop spacer or support assembly and shall provide a continuous barrier for a vertical distance referenced to the ceiling or floor level of not less than 250 mm. The assembly shall fit into a framed joist area dimensioned not larger than 12 mm greater than the outside diameter of the vent plus twice the dimension to be specified for clearance between vent sections and combustible enclosures. A radiation shield intended to penetrate the attic area shall fully enclose the vent section for a depth of not less than 250 mm above the top of the joist (See Figure 2).

3.9.2 Parts of a firestop spacer or support assembly which provide incidental shielding from radiation to combustible construction shall not be considered radiation shields.

3.9.3 A radiation shield shall not be provided to obtain safe temperatures on roof structures if employed in a roof or other terminating assembly intended to be altered in the field and if such alteration would require the shifting or relocation of the shield.

3.10 ATTIC INSULATION SHIELD

3.10.1 An attic insulation shield shall be provided to restrict loose fill or other insulation from contacting the vent section. The attic insulation shield assembly shall maintain a minimum air space clearance to combustible construction not less than the minimum air space clearance to combustible construction marked on the vent sections. For the test installation, the vertical height of the shield above attic construction material shall be not less than 250 mm (see Figure 2).

3.10.2 The attic insulation shield shall be separate from the firestop-spacer when the shield is intended to be removed. Also, the removal of the shield, or any part of the shield, shall not affect the firestop-spacer assembly. When the shield is not intended to be removed, the attic insulation shield is integral with the firestop spacer. The spacer assembly includes the attic insulation shield above the attic floor and the firestop-spacer below the attic joist.

3.11 CAPS

3.11.1 A cap shall be provided to prevent the entrance of debris or rain into the flue gas conveying conduit and into any cooling air passage terminating exterior to the building if such may cause the vent to become unsafe for use or cause damage to the heating appliance connected thereto.

3.11.2 A cap shall be designed so that leaves and debris falling or blown onto it are not likely to be retained so as to obstruct flue gas or cooling air passages.

3.11.3 A cap shall be designed so as to direct the flue gases above a horizontal plane coincident with the top of the upper terminal section.

3.12 ROOF ASSEMBLIES

3.12.1 A roof assembly shall be capable of resisting, without damage or giving way, a load equivalent to 1.44 kN/m² of exposed area applied to any surface extending above the roof in accordance with the test method described herein.

3.12.2 A roof assembly shall be resistant to weather and condensation. A roof assembly, when installed as specified by the manufacturer, shall prevent the entrance of water and debris into the building or enclosure where the vent passes through the roof or top of the enclosure.

3.12.3 A roof assembly shall be designed so that debris is not likely to accumulate therein when such accumulation may obstruct flue gas or cooling air passages or remain in contact with vent parts having temperatures exceeding the requirements for zero clearance.

3.13 DRAFT LOSS

3.13.1 A cap for direct attachment to a gas vent and a cap of a roof assembly or roof jack shall not excessively impede the flow of flue gases in still air as determined in accordance with Test No. 3 Draft Loss.

3.14 WIND EFFECTS

3.14.1 A cap for direct attachment to a gas vent having an internal diameter of 300 mm or less shall not excessively impede the flow of flue gases due to wind action at angles from 45° below horizontal to 45° above horizontal as determined in accordance with Test No. 4 Wind Effects.

3.14.2 A cap for direct attachment to a gas vent having an internal diameter of 300 mm or less shall induce an adequate updraft effect when subjected to wind flow past the cap, as determined in accordance with Test No. 4 Wind Effects.

4 PERFORMANCE

4.1 GENERAL

4.1.1 When a vent is tested in accordance with the requirements in this standard, safe temperatures to combustible construction shall be maintained; no part shall attain a temperature sufficient to damage required corrosion protection nor to cause creeping, distortion, sagging, or similar damage; resistance to damage by wind and rain shall be demonstrated.

4.2 TEST INSTALLATION

4.2.1 General

4.2.1.1 A Type B gas vent is to be tested on the following basis:

- A Size and kind (round, oval, etc);
- B Height;
- C Minimum clearance to combustible construction (Test Structure, Forms I [Figure 3] and II [Figure 4]); and
- D Intended type of installation (interior or exterior).

4.2.1.2 A Type BW gas vent is to be tested on the following basis:

- A Maximum appliance input;
- B Enclosure in stud space (Test Structure, Form III [Figure 9]); and
- C Single or multi storey buildings.

4.2.1.3 The test structure for a Type B vent is to be similar to that illustrated by Figure 3 and, where intended for exterior installation, by Figure 4. The structures are to provide for various sizes and designs following the details as shown by Figures 5 through 8.

4.2.1.4 The test structure for a Type BW gas vent is to be similar to that illustrated by Figure 9.

4.2.1.5 The test structure is to be erected within a room which is reasonably free of drafts, and the vent is to exhaust into the same space or into a space freely communicating with that from which the combustion air is taken. The room is to be such that during any one test the room temperature does not increase more than 11 °C above the room temperature at the beginning of the test.