Firewall Construction

Question?
There is a proposal for a firewall that incorporates wood framing into the assembly. The applicant is suggesting that the fire resistance rating for the firewall is achieved by the non-combustible components in the assembly. The assembly is referred to as a “shaft wall” and has been accepted as a firewall in BC, but we are of the opinion that the entire assembly must be of non-combustible construction. Could an SCO entertain a variance for this type of wall?

While the use of combustible content within a firewall has been permitted in other provinces, and is interpreted as being acceptable by the National Research Council (NRC), the Province of Alberta and the Chief Building Administrators (past and present) do not share the same opinion.

The 06-BCI-005-R1Standata for Two Hour Firewalls was developed to provide clarification and guidance to SCO’s and designers on how to interpret the minimum requirements, and the concerns to address when considering a proposed firewall assembly which is constructed of non-combustible materials other than masonry block or concrete. However, in any proposal, the use of combustible materials within the assembly would not be considered as meeting the intent of the ABC.

Proposals for assemblies of non-combustible materials, should review the information within the Standata as a guideline, and provide empirical data to demonstrate that the minimum considerations within the Standata have been achieved, when looked at as an equivalent under an Alternative Solution.

Background Information:
2014 Alberta Building Code requirements
3.1.10. Firewalls
3.1.10.2. Rating of Firewalls
1) A firewall that separates a building or buildings with floor areas containing a Group E or a Group F, Division 1 or 2 major occupancy shall be constructed as a fire separation of non-combustible construction having a fire-resistance rating not less than 4 h, except that where the upper portion of a firewall separates floor areas containing other than Group E or Group F, Division 1 or 2 major occupancies, the fire-resistance rating of the upper portion of the firewall is permitted to be not less than 2 h.
2) A firewall that separates a building or buildings with floor areas containing major occupancies other than Group E or Group F, Division 1 or 2 shall be constructed as a fire separation of non-combustible construction having a fire-resistance rating not less than 2 h.

3) Except as permitted by Sentence (4), the required fire-resistance rating of a firewall, except for closures, shall be provided by masonry or concrete.

4) A firewall permitted to have a fire-resistance rating not more than 2 h need not be constructed of masonry or concrete, provided
   a) the assembly providing the fire-resistance rating is protected against damage that would compromise the integrity of the assembly, and
   b) the design conforms to Article 4.1.5.17. (See Appendix A.)

A-3.1.10.2.(4) Firewall Construction. Inherent in the use of a firewall is the intent that this specialized wall construction provide the required fire-resistance rating while also being designed to resist physical damage—arising out of normal use—that would compromise the rating of the assembly. Traditionally, this has been accomplished by prescribing the use of non-combustible materials, which was in fact restricted to concrete or masonry. Sentences 3.1.10.2.(3) and (4) are intended to retain both of the characteristics of firewalls, while permitting greater flexibility in the use of materials and designs. The fire-resistance rating and damage protection attributes of a firewall may be provided by a single fire- and damage-resistant material such as concrete or masonry, by a fire and damage-resistant membrane on a structural frame, or by separate components—one that provides the fire-resistance rating and another one that protects the firewall against damage.

If the firewall is composed of separate components, the fire-resistance rating of the fire-resistive component needs to be determined for this assembly on its own. In addition, if the damage protection component is physically attached to the fire-resistant component (for example, as a sacrificial layer), then for the purposes of determining the overall performance of the assembly, it is also necessary to determine through testing whether failure of the damage protection component during a fire affects the performance of the fire-resistive component.

Firewall means a type of fire separation of noncombustible construction that subdivides a building or separates adjoining buildings to resist the spread of fire and that has a fire-resistance rating as prescribed in this Code and has structural stability to remain intact under fire conditions for the required fire-rated time.

Standata 06-BCI-005-R1
INTERPRETATION
Compliance with Sentence 3.1.10.2.(4) for a two-hour firewall that is constructed of noncombustible materials other than masonry or concrete can be obtained, provided:

1. The fire-resistance rating of the proposed assembly has been evaluated by a testing agency that has been accredited by the Standards Council of Canada for conformance to CAN/ULC-S101, "Fire Endurance Tests of Building Construction and Materials" and incorporated the damage protection features at the time of testing.

2. The damage protection features must be an integral component of the assembly being tested. External damage protection features such as fencing or other physical barricades would not be appropriate based on the evaluation of Intent Statement #2 from the National Research Council.
3. The Hose Stream Test required by Clause 5.2. of CAN/ULC-S101, "Fire Endurance Tests of Building Construction and Materials" shall be conducted on the original specimen subjected to the fire endurance test referred to in Sentence (1). The duplicate specimen mentioned in Clause 5.2.1.1. shall not be permitted.

4. The structural integrity aspects of the assembly have been designed by a professional engineer licensed to practice in the province of Alberta in accordance with Article 4.1.5.17. and the commentary entitled "Structural Integrity of Firewalls" in the User's Guide – NBC 2005, Structural Commentaries (Part 4 of Division B) published by the National Research Council of Canada.

5. The damage protection features of the assembly have been designed by a professional engineer licensed to practice in the province of Alberta. The professional engineer must provide evidence to the authority having jurisdiction that the damage protection features will provide the necessary performance required by Clause 3.1.10.2.(4)(a) and will provide an equivalent level of performance as that of masonry or concrete. This evidence could be in the form of calculations, physical tests or research performed by others and must demonstrate to the satisfaction of the authority having jurisdiction that the firewall will be protected from damage due to any hazard present in the building during construction and occupancy, such as:

a. fall, collapse, or expansion of stored items and building contents such as elevated vessels, racks, or shelving,
b. explosion of contents in the area of the firewall such as pressure vessels or flammable materials,
c. mechanical damage from vehicles, equipment or occupants,
d. fracture, penetration, and fragmentation that can be caused by a fire, sprinkler activation, or fire-fighting efforts,
e. collapse of adjacent roof and wall structures or adjoining buildings, or
f. any other factors that may affect the ability of the structure to comply with the intent of the Alberta Building Code.
TWO-HOUR FIREWALLS

BACKGROUND
Historically, firewalls used to subdivide buildings into smaller units have been built using one of two types of construction: masonry block or solid concrete. These materials have been required for firewall construction by the Alberta Building Code since at least 1974.

Recently, advances in technology and construction practices have led to the development of proposed firewall assemblies that do not use masonry block or concrete. A provision was added to the Alberta Building Code 2006 in Subsection 3.1.10. that permits the construction of two-hour firewalls using noncombustible materials other than masonry or concrete.

Municipalities and the Safety Codes Council have expressed concern as to how a safety codes officer will evaluate a proposed firewall assembly to determine whether it meets the Code requirements. This STANDATA gives guidance to safety codes officers and designers in how to interpret the requirements in Subsection 3.1.10. for firewall assemblies that are constructed of noncombustible materials other than masonry block or concrete.

DISCUSSION
Sentence 3.1.10.2.(4) states that a two-hour firewall using noncombustible materials need not be constructed of masonry block or concrete. As the new appendix note and the intent statements from the National Research Council indicate, the intent of this Sentence is not to allow any type of construction for a firewall without proper damage protection and testing of the assembly. The appendix note states, "...it is also necessary to determine through testing whether failure of the damage protection component during a fire affects the performance of the fire-resistive component."

The national standard for the evaluation of the fire-resistance rating of wall assemblies referenced in the Alberta Building Code 2006 is CAN/ULC-S101, "Fire Endurance Tests of Building Construction and Materials." Clause 5.2.1.1. of ULC S101 states that once a fire endurance period is determined for a given assembly of materials, the Hose Stream Test shall be conducted on an alternate specimen that has been exposed to fire for no more than one hour. The theory behind this clause is that if a fire has been burning in a building for anything more than one hour, the building will be lost, so whether the fire separation can withstand the application of a firefighter's hose stream after that time is...
irrelevant. This logic may be appropriate for standard fire separations, but is not appropriate in the case of firewalls that are used to subdivide buildings.

Firewalls have traditionally been built using masonry or concrete, which do not require the substitution of an alternate test specimen for the application of the Hose Stream Test in ULC S101. As such, in order to determine an equivalent level of safety in any proposed alternate solution to masonry or concrete, the test procedure for the assembly should be modified so as to not use an alternate test specimen for the application of the Hose Stream Test.

At present, there is no recognised Canadian standard for the evaluation of firewalls constructed of noncombustible materials other than masonry or concrete; consequently, it would be appropriate for a safety codes officer to request professional involvement on a project that is proposing to incorporate this kind of firewall. Firewalls require professional involvement for the structural design aspects, such as lateral stability and prevention of collapse, but there is no requirement for professional involvement on the damage protection aspect. Sentence 2.4.2.1.(8) of Division C gives the safety codes officer the authority to ask for an engineer to be involved in the evaluation of the damage protection features of the firewall.

The design of the damage protection features must be evaluated based on an equivalency to masonry or concrete. Masonry and concrete are inherently resistant to external damage, and any proposed firewall would have to meet or exceed the level of protection from physical damage provided by masonry or concrete. It would be the responsibility of the design professional to ensure that that evaluation has been performed.

All of the other requirements for firewalls in Subsection 3.1.10. and Article 4.1.5.18. still apply with regards to structural design and allowable materials. The commentary entitled "Structural Integrity of Firewalls" in the User's Guide – NBC 2005, Structural Commentaries (Part 4 of Division B) published by the National Research Council contains additional information for structural designers in regards to impact loads, thermal expansion and structural integrity.

**CODE REFERENCES**

1. Sentence 3.1.7.1.(1) states:

   3.1.7.1. Determination of Ratings
   
   1) Except as permitted by Sentence (2) and Article 3.1.7.2., the rating of a material, assembly of materials or a structural member that is required to have a fire-resistance rating, shall be determined on the basis of the results of tests conducted in conformance with CAN/ULC-S101, "Fire Endurance Tests of Building Construction and Materials."
2. Sentence 3.1.10.1.(1) states:

3.1.10.1. Prevention of Firewall Collapse
1) Except as permitted by Sentence (2), the connections and supports for structural framing members that are connected to or supported on a firewall and have a fire-resistance rating less than that required for the firewall, shall be designed so that the failure of the framing systems during a fire will not affect the integrity of the firewall during the fire.

3. Article 3.1.10.2. states:

3.1.10.2. Rating of Firewalls
1) A firewall that separates a building or buildings with floor areas containing a Group E or a Group F, Division 1 or 2 major occupancy shall be constructed as a fire separation of noncombustible construction having a fire-resistance rating not less than 4 h, except that where the upper portion of a firewall separates floor areas containing other than Group E or Group F, Division 1 or 2 major occupancies, the fire-resistance rating of the upper portion of the firewall is permitted to be not less than 2 h.
2) A firewall that separates a building or buildings with floor areas containing major occupancies other than Group E or Group F, Division 1 or 2 shall be constructed as a fire separation of noncombustible construction having a fire-resistance rating not less than 2 h.
3) Except as permitted by Sentence (4), the required fire-resistance rating of a firewall, except for closures, shall be provided by masonry or concrete.
4) A firewall permitted to have a fire-resistance rating not more than 2 h need not be constructed of masonry or concrete, provided
   a) the assembly providing the fire-resistance rating is protected against damage that would compromise the integrity of the assembly, and
   b) the design conforms to Article 4.1.5.18.

(See Appendix A.)

4. Appendix note A-3.1.10.2.(4) states:

A-3.1.10.2.(4) Firewall Construction. Inherent in the use of a firewall is the intent that this specialized wall construction provide the required fire-resistance rating while also being designed to resist physical damage—arising out of normal use—that would compromise the rating of the assembly. Traditionally, this has been accomplished by prescribing the use of noncombustible materials, which was in fact restricted to concrete or masonry. Sentences 3.1.10.2.(3) and (4) are intended to retain both of the characteristics of firewalls, while permitting greater flexibility in the use of materials and designs. The fire-resistance rating and damage protection attributes of a firewall may be provided by a single fire- and damage-resistant material such as concrete or masonry, by a fire- and damage-resistant membrane on a structural frame, or by separate components—one that provides the fire-resistance rating and another one that protects the firewall against damage.

If the firewall is composed of separate components, the fire-resistance rating of the fire-resistive component needs to be determined for this assembly on its own. In addition, if the damage protection component is physically attached to the fire-resistive component (for example, as a sacrificial layer), then for the purposes of determining
the overall performance of the assembly, it is also necessary to determine through
testing whether failure of the damage protection component during a fire affects the
performance of the fire-resistive component.

5. Article 4.1.5.18. states:

4.1.5.18. Firewalls
1) Firewalls shall be designed to resist the maximum effect due to
   a) the appropriate lateral design loads prescribed elsewhere in this Section, or
   b) a factored lateral load of 0.5 kPa under fire conditions, as described in
      Sentence (2).
2) Under fire conditions, where the fire-resistance rating of the structure is less
   than that of the firewall,
      a) lateral support shall be assumed to be provided by the structure on one
         side only, or
      b) another structural support system capable of resisting the loads imposed by
         a fire on either side of the firewall shall be provided.

6. Sentence 2.4.2.1.(8) of Division C states:

2.4.2. Professional Involvement
2.4.2.1. General
...
8) If the size or complexity of a project may give rise to special safety concerns, the
   authority having jurisdiction may require
      a) that all or part of the plans and specifications of a building be imprinted with
         a stamp or seal affixed by a
            i) professional engineer where engineering work is involved,
            ii) registered architect where architectural work is involved, or
            iii) both a professional engineer and registered architect, and
      b) that field reviews during construction of a building be performed by a
         i) professional engineer where engineering work is involved,
         ii) registered architect where architectural work is involved, or
         iii) both a professional engineer and registered architect.

INTENT ANALYSIS
In addition to the requirements in the Alberta Building Code 2006, there is additional
information available from the National Research Council on the intent statements for
Sentence 3.1.10.2.(4).

Intent 1:
To limit the probability that the materials used to construct the assembly providing the fire-
resistance rating of a firewall will be easily altered or damaged during use, which could lead to
an inability of the firewall to control the spread of fire from an adjacent building to the subject
building, which could lead to damage to the subject building.

Intent 2:
To limit the probability that the materials used to construct the assembly providing the fire-
resistance rating of a firewall will be easily damaged by falling debris during a fire, which could
lead to an inability of the firewall to control the spread of fire from an adjacent building to the subject building, which could lead to damage to the subject building.

**Intent 3:**
To exempt certain materials from the application of Sentence 3.1.10.2.(3) if these materials and their application achieve the minimum level of performance required by Sentence 3.1.10.2.(4)

**INTERPRETATION**
Compliance with Sentence 3.1.10.2.(4) for a two-hour firewall that is constructed of noncombustible materials other than masonry or concrete can be obtained, provided:

1. The fire-resistance rating of the proposed assembly has been evaluated by a testing agency that has been accredited by the Standards Council of Canada for conformance to CAN/ULC-S101, "Fire Endurance Tests of Building Construction and Materials" and incorporated the damage protection features at the time of testing.

2. The damage protection features must be an integral component of the assembly being tested. External damage protection features such as fencing or other physical barricades would not be appropriate based on the evaluation of Intent Statement #2 from the National Research Council.

3. The Hose Stream Test required by Clause 5.2. of CAN/ULC-S101, "Fire Endurance Tests of Building Construction and Materials" shall be conducted on the original specimen subjected to the fire endurance test referred to in Sentence (1). The duplicate specimen mentioned in Clause 5.2.1.1. shall not be permitted.

4. The structural integrity aspects of the assembly have been designed by a professional engineer licensed to practice in the province of Alberta in accordance with Article 4.1.5.18. and the commentary entitled "Structural Integrity of Firewalls" in the User's Guide – NBC 2005, Structural Commentaries (Part 4 of Division B) published by the National Research Council of Canada.

5. The damage protection features of the assembly have been designed by a professional engineer licensed to practice in the province of Alberta. The professional engineer must provide evidence to the authority having jurisdiction that the damage protection features will provide the necessary performance required by Clause 3.1.10.2.(4)(a) and will provide an equivalent level of performance as that of masonry or concrete. This evidence could be in the form of calculations, physical tests or research performed by others and must demonstrate to the satisfaction of the authority having jurisdiction that the firewall will be protected from damage due to any hazard present in the building during construction and occupancy, such as:

   a. fall, collapse, or expansion of stored items and building contents such as elevated vessels, racks, or shelving,
b. explosion of contents in the area of the firewall such as pressure vessels or flammable materials,

c. mechanical damage from vehicles, equipment or occupants,

d. fracture, penetration, and fragmentation that can be caused by a fire, sprinkler activation, or fire-fighting efforts,

e. collapse of adjacent roof and wall structures or adjoining buildings, or

f. any other factors that may affect the ability of the structure to comply with the intent of the Alberta Building Code.

This INTERPRETATION is applicable throughout the province of Alberta.
Ventilation and requirements for cooking taking place at Restaurant Tables?

Question?
Are there any ventilation requirements for “Korean BBQ” Restaurants who cook items at the tables using fondue pots and heating elements?

All applicable Alberta Building Codes and Standards for the design and installation of a buildings ventilation system would apply for the intended use of the building. Additional safety requirements of will be governed by the Alberta Fire Code and Standards, Alberta health Services, and Occupational Health and Safety.

Background Information:
2014 Alberta Building Code requirements
6.2.2.1. Required Ventilation
1) Except as provided in Sentence (3), all buildings shall be ventilated in accordance with this Part.

6.2.2.5. Air Contaminants
4) Air contaminants in spaces where workers will be present shall not exceed the occupational exposure limits set out in the Occupational Health and Safety Act and its Regulations.

6.2.2.7. Commercial Cooking Equipment
1) Systems for the ventilation of commercial cooking equipment shall be designed, constructed and installed to conform to NFPA 96, “Ventilation Control and Fire Protection of Commercial Cooking Operations,” except as required by Sentence 3.6.3.1.(1) and Article 3.6.4.2.

6) A food establishment in which food is prepared and the process generates odours, smoke, steam or heat shall have a mechanical ventilation system that includes canopies, ductwork and fans to remove odours, smoke, steam or heat to the exterior of the building.

NFPA 96 – 2011 edition
Chapter 4 General Requirements
4.1 General.
4.1.1 Cooking equipment used in processes producing smoke or grease-laden vapors shall be equipped with an exhaust system that complies with all the equipment and performance requirements of this standard.

4.1.1.1* Cooking equipment that has been listed in accordance with UL 197 or an equivalent standard for reduced emissions shall not be required to be provided with an exhaust system. A.4.1.1.1 See UL 710B.

4.1.9* Cooking equipment used in fixed, mobile, or temporary concessions, such as trucks, buses, trailers, pavilions, tents, or any form of roofed enclosure, shall comply with this standard.
A.4.1.9 The authority having jurisdiction can exempt temporary facilities, such as a tent, upon evaluation for compliance to the applicable portions of this standard. Although it might not be practical to enforce all requirements of this standard in temporary facilities, the authority having jurisdiction should determine that all necessary provisions that affect the personal safety of the occupants are considered.

2014 Alberta Fire Code
2.4.3.2. Flaming Meals and Drinks
1) In Group B, Divisions 2 and 3 care and treatment occupancies, flaming meals or drinks shall not be served.
2) In assembly occupancies, flaming meals or drinks shall be ignited only at the location of serving.
   a) outside the serving area, and
   b) away from ignition sources.
4) A portable extinguisher having a minimum rating of 5-B:C shall be located on the serving cart or table where flaming meals and drinks referred to in Sentences (2) and (3) are served.
Fixed Fire Suppression & Exhaust Systems – Cooking

ISSUE:
A number of queries from owners, designers and safety codes officers have been received regarding fire suppression and exhaust systems for non-residential cooking installations. These questions have included:

- When is a kitchen exhaust system required in a commercial setting?
- Does a commercial kitchen exhaust system always require a fixed fire suppression system?
- What cooking appliances/processes require the coverage of a fixed fire suppression system?
- What standards apply to fire suppression and exhaust systems?
- Why are older systems no longer acceptable for use?
- What are the maintenance requirements for fixed fire suppression systems and kitchen exhaust systems?
- Are there allowances in codes and/or standards for limited usage facilities?

CODE REQUIREMENTS:
As opposed to copying verbatim the relevant portions of the Alberta Fire and Building Codes the reader is encouraged to utilise the noted references to look up these portions of each code.

Alberta Building Code Requirements:

The installation of fire suppression systems and exhaust systems is under the jurisdiction of the Alberta Building Code (ABC). A Building Safety Codes Officer should be consulted for building permit and professional involvement requirements.

- 3.3.1.2.(2) Hazardous Substances, Equipment and Processes
- A-3.3.1.2.(2) Cooking Equipment Ventilation
- 6.2.2.6.(1 through 6) Commercial Cooking Equipment
- 9.10.1.3. Items under Part 6 Jurisdiction

Items from Part 10 only apply to Relocatable Industrial Accommodation

- 10.6.4.1. Cooking Equipment Ventilation System
- 10.6.4.3. Exception for Existing Modules
Alberta Fire Code Requirements:

The use, inspection and maintenance of suppression systems and exhaust systems are under the jurisdiction of the Alberta Fire Code (AFC). A Fire Safety Codes Officer should be consulted regarding verification of the use, inspection and maintenance.

- 2.6.1.9. (1 through 7) Commercial Cooking Equipment
- A-2.6.1.9.(3)
- Division C 2.2.4.1. Qualifications
- A-2.2.4.1.(1)(a)
- A-2.2.4.1.(2)

CONSIDERATIONS:

When is a kitchen exhaust system required in a commercial setting?

The answer is . . . almost always. As noted in Sentences 3.3.1.2.(2), 6.2.2.6.(6) and 9.10.1.3.(1) of the ABC 06 any food preparation that creates grease laden vapours, odours, smoke, steam or heat in any facility for the cooking of food, other than in an individual residential dwelling unit for the use by the occupants, will require a ventilation system for that facility where the potential for the production of smoke and grease-laden vapours exceeds that expected from normal residential family use.

Where grease laden vapours or smoke, are generated, outside an enclosed appliance, then the exhaust system must meet the requirements of NFPA 96. This will include a hood meeting the requirements of the referenced standards and welded seamless ductwork and all required labelled access panels. (A listing of appliances/processes automatically deemed to create grease laden vapours is provided later in this document). In addition these systems will require a fire suppression system which complies to the requirements of the ABC 06 and AFC 06.

Where the process or facility for the cooking of food does not create grease laden vapours or smoke but does create odours, steam or heat will require a stainless steel hood and ventilation system for that facility which meets the requirements of Sentences 6.2.2.6.(3) to (6) of the ABC 06.

Does a commercial kitchen exhaust system always require a fixed fire suppression system?

The deciding factor as to whether or not a fire suppression system is required is whether the potential for the production of smoke and grease-laden vapours exceeds that for normal residential family use. As noted above there are many appliances that automatically require that they be covered by an NFPA 96 compliant hood with a wet chemical fixed suppression system properly protecting all the appliances.

In addition, where a fire suppression system is installed, a K Class extinguisher is required to be installed within 9.15 m of the appliances.

What cooking appliances/processes require the coverage of a fixed fire suppression system?

(While all appliances used in Alberta are required to be certified for use under the terms of the Safety Codes Act commercial appliances may also have been tested/listed to quantify needs for fire suppression system protection).
Appliances & devices, (hoods and ducts) that have been tested and shall be protected:

- Fryers
- Pressure Fryers, (with lids)
- Ranges – (including residential ranges if they are used in a commercial/ institutional cooking operation)
- Griddles – (flat top cast iron cooking surface)
- Open top chain broilers
- Closed top chain broilers
- Char Broilers, gas radiant, electric, lava rock, charcoal, mesquite, wood - CAUTION - Solid fuel fired or supplemented appliances are required to be under a separate exhaust/hood system, other requirements regarding fire hoses also exist
- Upright Broilers/Salamander Broilers
- Woks
- Tilt Skillets/brassing pans – (DO NOT Confuse with Tilting Kettles)
- Exhaust Canopies, (plenums, all ducts, behind filters)

Cautions:
- No Water Wash Canopies with a fire cycle have been tested to ULC ORD 1254.6-1995 therefore they must have a suppression system.
- No CO2 system has been tested to ULC ORD 1254.6-1995 therefore they do not meet the requirements of the ABC or AFC.
- No Sprinkler System has been tested to ULC ORD 1254.6-1995 therefore they do not meet the requirements of the ABC or AFC.

- Exhaust Ducts:
  - Where there is a damper at the duct interface with the hood the 1st duct nozzle must be installed immediately above the damper and an access door for installation and servicing the nozzle(s) SHALL be provided within 18 inches of the damper.
  - Nozzle must not interfere with the operation of the damper – on many occasions the connection between the duct collar and the duct is distorted by the installer of the duct and the damper will not close.

Appliances that have not been tested/listed for fire suppression coverage but require protection based upon the production of grease laden vapours

- Horizontal Rotisserie (without enclosing doors)
- Vertical Rotisserie (shawarma, donair, gyro) Machines
- Induction Cookers when used to sauté or fry

Additional Requirements:

- Type B gas type extinguishers are not permitted in a kitchen.
- Since the adoption of the ABC 1997, where there is a kitchen fire suppression system installed in a building with a fire alarm system the suppression system SHALL be tied into the building fire alarm so that if there is a system discharge the building fire alarm SHALL sound.
What cooking appliances/processes do NOT require the coverage of a fixed fire suppression system?

Enclosed appliances
- Ovens, including cook and hold ovens, warming ovens and steam ovens
- Pizza Ovens (pizza decks)
- Masonry or Cement Pizza Ovens,
- Chicken Rotisseries with doors

Other appliances
- Steamers,
- Rice Cookers,
- Soup kettles,
- Proofers,

What standards apply to kitchen fire suppression and exhaust systems?

The ABC and AFC dictate the requirements and standards for these systems. From those documents comes the need for systems to either meet the requirements of:

- ABC Sentences 6.2.2.6.(3 to 6) for those smaller installations where the activity involves minimal cooking (such as the preparation of soup and sandwiches or warming of food cooked elsewhere served by an outside caterer, typically using "residential" appliances) with no production of smoke or grease laden vapours, or

- NFPA 96, NFPA 17A, UL 300 and ULC/ORD-C1254.6, "Fire Testing of Restaurant Cooking Area Fire Extinguishing System Units." (Each of these references additional standards which will need to be met regarding the equipment and installation methods used and the ongoing maintenance and cleaning of the systems).

In both cases the requirements of NFPA 96 related to the regular cleaning and maintenance of the ventilation system by qualified persons will also apply.

Why are older systems no longer acceptable for use?

In the 1980s and 1990s health concerns prompted the use of liquid vegetable oils rather than shortening to fry in commercial cooking operations. This resulted in an ability to increase the cooking temperatures to speed up frying processes. At these higher temperatures the fire protection systems previously used (dry chemical powder and early wet chemical systems) proved to be ineffective in both extinguishing and preventing the re-ignition of the vegetable oils.

Previous kitchen suppression systems fire testing standard UL 300(ULC/ORD 1254.6) used mock ups of appliances with limited or no pre-burn time. Under the new (current) UL 300 (ULC/ORD 1254.6) standards, actual appliances are used with fire burning times that actually activate the auto suppression system. These tests resulted in the development of newer wet chemical (NFPA 17A/UL 300) systems and lead to the withdrawal of manufacturer service support, replacement parts and extinguishing agent for the older wet and dry chemical systems used in cooking applications.

The new UL300 Standard "Fire Extinguishing Systems for Protection of Restaurant Cooking Areas" came into effect on November 21, 1994 and the ULC/ORD-1254.6 "Fire Testing of Restaurant Cooking Area Fire Extinguishing Systems Units" effective date was July 1, 1995.
What are the maintenance requirements for fixed fire suppression systems and kitchen exhaust systems?

- Semi-annual maintenance of the suppression system by a qualified person, and
- Exhaust/hood cleaning at least annually by a qualified person.

<table>
<thead>
<tr>
<th>Systems serving solid fuel cooking operations&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Monthly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systems serving high-volume cooking operations, such as 24-hour cooking, charbroiling, or wok cooking&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Quarterly</td>
</tr>
<tr>
<td><strong>Type and/or Volume of Cooking Frequency</strong></td>
<td>Frequency</td>
</tr>
<tr>
<td>Systems serving moderate-volume cooking operations&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Semiannually</td>
</tr>
<tr>
<td>Systems serving low-volume cooking operations, such as churches, day camps, seasonal businesses, or senior centers&lt;sup&gt;b&lt;/sup&gt;</td>
<td>Annually</td>
</tr>
</tbody>
</table>

<sup>a</sup> These are minimum cleaning cycles
<sup>b</sup> These MAY be extended if, in the opinion of the owner and the Authority Having Jurisdiction (AHJ) in the Fire Discipline, and physical inspection supports this opinion, there is no appreciable or noticeable accumulation of grease, dust or other residue throughout the hood and duct system.

For additional information on the requirements for kitchen exhaust cleaning, including training and record keeping in Alberta see STANDATA FCI-09-04 Maintenance of Commercial Cooking Equipment at:


**Are there allowances in codes and/or standards for limited usage facilities?**

Possibly through the acceptance by the AHJ of an Alternative Solution. Many community halls and similar facilities may only use the kitchen and appliances to cook food very infrequently and in many instances these kitchens will be used only to warm or heat previously cooked food for events in the building and a stove may be used to create sauces or a grill may only be used to cook pancakes.

In these instances a frank discussion between the owner and fire and building officials is required, preferably prior to construction/installation, to evaluate the proposed activities, plans and procedures and to determine the requirements for exhaust and suppression. If, through the consultation, the owner determines that they may be able to achieve an equivalent or higher level of safety through alternative methods to those in the building or fire codes, they may request acceptance of an Alternative Solution submitted to the appropriate discipline SCO. If accepted the Alternative Solution will be registered with the Safety Codes Council.

**Are there requirements for interconnection of exhaust, suppression, fuel/energy and fire alarm systems?**

Exhaust fans in the ventilating system must continue to function upon activation of the suppression system. The forced draft of these fans assists the movement of the fire suppression
agent through the ventilating system, thus aiding with fire suppression within the duct system. These fans also remove smoke and provide a cooling effect in the plenum and duct after the fire suppression system has been discharged. The system is UL listed with or without fan operation.

Where multiple hoods use an interconnected or common duct then all ductwork must be protected, even where one of the hoods has no appliances requiring protection.

All fuels or energy used to heat appliances must automatically disconnect upon activation of the suppression system. In addition in buildings built, or which have had the fire alarm system upgraded, since the adoption of the 1997 ABC the activation of the suppression system must also put the fire alarm system, when present, into alarm.

Are there requirements for kitchen suppressions systems to be engineered?

Yes. Systems consist of components which are listed and pre-engineered for a specified size, type and location of hazard by the manufacturer and this engineering should be sufficient. Where this engineering has not been provided by the manufacturer for use by the installer additional engineering will be required by the permitting authority. The verification process can then be completed by the installing technician who would provide documentation to the coordinating professional where required.

If a suppression system is used to protect an appliance that has not been fire tested by a Listing Agency, (protection specified in the Manufacturer’s Listed Manual), then the system is no longer Pre-Engineered – it now becomes a non-Engineered System requiring site specific drawings and the stamp of a professional engineer.

What about when appliances are changed or moved. Does this require re-engineering?

Movement of appliances under the same hood, and the movement or switching of nozzles by a qualified technician, would not require additional engineering provided there is no addition of new appliances in both number and type. If this involves changes to energy supplies (new wire, new piping) then there will be a need for a gas and/or electrical permit.

Once additional appliances are added the capacity of both the ventilation (hood) system and the suppression system will need to be evaluated. As such, in addition to required gas and/or electrical permits, a building permit will be required to ensure that the systems remain appropriate to the hazard presented. This will involve a need for additional engineering in most instances as well.

What is required when used hoods or appliances are placed into a facility?

In all cases permits for building, electrical and likely gas will be required. SCO’s have the discretion to accept previously installed equipment provided it continues to meet the requirements of the codes and standards under the Safety Codes Act. As such fire suppression systems which have not been certified to UL 300 (ULC/ORD 1254.6) are not acceptable.

This Interpretation applies throughout the Province of Alberta

1 All references are to Division B of the respective Code unless otherwise stated.
“Hookah Bars”

Question?
Ventilation requirements for “hookah bars”. Smoking is smoking – why does the province not govern this; almost all combustible matter produces carcinogens when burned?
Alberta Health Services and Occupational Health and Safety are currently studying, managing and changing the legislation and requirements for smoking products and business in Alberta and will be ongoing into the future as it continues to be a health concern.

Background Information:
2014 Alberta Building Code requirements
6.2.1.1. Good Engineering Practice
2) Where a health or safety hazard to a worker could result from the production or dissemination of airborne contaminants or from oxygen deficiency in the air, the ventilation systems serving these spaces shall conform to the Occupational Health and Safety Act and its Regulations.

Waterpipe Smoking in Alberta

A Report by the Office of the Chief Medical Officer of Health
February 2012

“The Alberta Tobacco Reduction Act, Act 5A 2008 c.T3.8 currently prohibits smoking of tobacco in enclosed public places, workplaces and within five metres from a doorway, window or air intake to a public place or workplace. Waterpipe tobacco mixtures are prohibited under the legislation in the locations specified above; however, the legislation does not prohibit the use of herbal mixtures that do not contain tobacco. Alberta Health and Wellness lacks the capacity to monitor if mixtures do contain tobacco or not.”

Current Action in Alberta:
In Alberta, two research studies focusing on waterpipe use are currently underway. When completed, the findings from the research studies will be used to develop a waterpipe awareness campaign for Alberta. The awareness campaign will likely occur later in the 2012/2013 fiscal year in partnership between Alberta Health and Wellness and Alberta Health Services.

Moving forward:
Intervention will likely become more difficult as more establishments adopt waterpipe use. Early intervention will help to achieve desired outcomes. It is therefore proposed that Alberta Health and Wellness begin work on amending the Tobacco Reduction Act to prohibit the use of waterpipe smoking in public places, workplaces and within 5 meters from the doorway, window or air intake to a public place or workplace.
Having more restrictive legislation on waterpipes would reduce the amount of second-hand smoke that patrons and employees are exposed to; reduce the uncertainty and costs associated with determining if the product being smoked in a waterpipe actually contains tobacco or not; and create awareness
regarding the harmful effects of waterpipes, making it less appealing to youth and young adults. Although there may be concerns raised related to the cultural and religious use of waterpipes, this recommendation is nonetheless aligned with the direction of the World Health Organization.

Alberta Health Services - Waterpipe Smoking February 2014

“Recent Alberta research has found that even the non-tobacco, or “herbal” shisha products used in waterpipes produce toxic air pollutants – including carbon monoxide, volatile aldehydes and polyaromatic hydrocarbons. In fact, both the mainstream and second-hand smoke produced by herbal shisha contained these known cancer causing agents at levels equal to or greater than that of tobacco products.

Air quality in Shisha venues affects not only owners/operators of waterpipe venues, but also employees. If the waterpipe venue is part of a multi-unit building, people in adjacent units may also be adversely affected.”

Link - https://www.albertaquits.ca/files/AB/files/library/Waterpipe_smoking_FINAL.pdf

“Ventilation provides no solution to the problem of exposure to second-hand smoke.” —Protection from second-hand tobacco smoke in Canada: Applying health science to occupational health and safety law (Collishaw & Meldrum, 2002)
Stairway Lighting Control – Energy Code

Question?
Can lights in exits stairways (or corridors) be shut off, dimmed to a certain percentage or must they be on continuously?
The NECB requires that the interior lighting in buildings be controlled with automatic control devices which will shut off the lighting to spaces, with some exceptions noted within Sentence 4.2.2.1.(4). These exceptions include spaces which would endanger the safety or security of the occupants, operational requirements of a building, and patient care areas. NFPA 101 Sentence 7.8.1.2 indicates that illumination of means of egress shall be continuous during the time that the conditions of occupancy require that the means of egress be available for use, unless otherwise provided.

However, the local AHJ has the authority to determine that a reasonable degree of safety is being provided in all situations.

Background Information:
2011 NECB
4.2.2. Interior Lighting Controls
4.2.2.1. Automatic Lighting Shut-off Controls (See Appendix A.)
1) Except as provided in Sentence (4), interior lighting in buildings shall be controlled with automatic control devices to shut off building lighting in all spaces.

2) The automatic control devices referred to in Sentence (1) shall be:
a) time-of-day operated control devices that turn lighting off at scheduled times,
b) occupant sensors that turn lighting off within 30 minutes of a space being unoccupied, or
c) a signal from another control or alarm system that indicates the area is unoccupied.

3) A time-of-day operated control device provided in accordance with Clause (2)(a) shall not have the capability of being overridden by more than two hours.

4) The requirements of Sentence (1) shall not apply to:
a) lighting required round the clock due to operational requirements,
b) lighting in spaces where patient care is rendered, and
c) lighting in spaces where an automatic shut-off would endanger the safety or security of its occupants.
A-4.2.2.1. Automatic Control Devices. “Occupant sensors” refers to motion sensors, presence
sensors, vacancy sensors, and other similar devices.
Products that allow for on-site calibration of their sensitivity are recommended as they allow
situations of false tripping to be managed.
Using controllable circuit breakers as a means of automatic control is only permitted when they
are connected to sensors.

NFPA 101-2012 Edition:
7.8 Illumination of Means of Egress.
7.8.1 General.
7.8.1.1* Illumination of means of egress shall be provided in accordance with Section 7.8 for
every building and structure where required in Chapters 11 through 43. For the purposes of this
requirement, exit access shall include only designated stairs, aisles, corridors, ramps,
escalators, and passageways leading to an exit. For the purposes of this requirement, exit
discharge shall include only designated stairs, aisles, corridors, ramps, escalators, walkways,
and exit passageways leading to a public way.

7.8.1.2 Illumination of means of egress shall be continuous during the time that the conditions of
occupancy require that the means of egress be available for use, unless otherwise provided in
7.8.1.2.2.

7.8.1.2.1 Artificial lighting shall be employed at such locations and for such periods of time as
are necessary to maintain the illumination to the minimum criteria values herein specified.

7.8.1.2.2 Unless prohibited by Chapters 11 through 43, automatic, motion sensor-type lighting
switches shall be permitted within the means of egress, provided that the switch controllers
comply with all of the following:
(1) The switch controllers are listed.
(2) The switch controllers are equipped for fail-safe operation and evaluated for this purpose.
(3) The illumination timers are set for a minimum 15-minute duration.
(4) The motion sensor is activated by any occupant movement in the area served by the lighting
units.
(5) The switch controller is activated by activation of the building fire alarm system, if provided.

7.8.1.2.3* Energy-saving sensors, switches, timers, or controllers shall be approved and shall
not compromise the continuity of illumination of the means of egress required by 7.8.1.2.

7.8.1.3* The floors and other walking surfaces within an exit and within the portions of the exit
access and exit discharge designated in 7.8.1.1 shall be illuminated as follows:
(1) During conditions of stair use, the minimum illumination for new stairs shall be at least 10 ft-
candle (108 lux), measured at the walking surfaces.
(2) The minimum illumination for floors and walking surfaces, other than new stairs during
conditions of stair use, shall be to values of at least 1 ft-candle (10.8 lux), measured at the floor.
(3) In assembly occupancies, the illumination of the walking surfaces of exit access shall be at
least 0.2 ft-candle (2.2 lux) during periods of performances or projections involving directed
light.
(4)*The minimum illumination requirements shall not apply where operations or processes
require low lighting levels.

7.8.1.4* Required illumination shall be arranged so that the failure of any single lighting unit
does not result in an illumination level of less than 0.2 ft-candle (2.2 lux) in any designated area.
7.8.1.5 The equipment or units installed to meet the requirements of Section 7.10 also shall be permitted to serve the function of illumination of means of egress, provided that all requirements of Section 7.8 for such illumination are met.

7.8.2 Sources of Illumination.
7.8.2.1* Illumination of means of egress shall be from a source considered reliable by the authority having jurisdiction.

7.8.2.2 Battery-operated electric lights and other types of portable lamps or lanterns shall not be used for primary illumination of means of egress. Battery-operated electric lights shall be permitted to be used as an emergency source to the extent permitted under Section 7.9.

7.2.2.5.5.11 Exit Stair Illumination. Exit enclosures where photoluminescent materials are installed shall comply with all of the following:
(1) The exit enclosure shall be continuously illuminated for at least 60 minutes prior to periods when the building is occupied.
(2) The illumination shall remain on when the building is occupied.
(3) Lighting control devices provided for illumination within the exit enclosure shall meet all of the following requirements:
(a) Lighting control devices that automatically turn exit enclosure lighting on and off, based on occupancy, shall be permitted, provided that they turn on illumination for charging photoluminescent materials for at least 60 minutes prior to periods when the building is occupied.
(b) Lighting used to charge photoluminescent materials shall not be controlled by motion sensors.
(c) Lighting control devices that dim the lighting levels within the exit enclosure shall not be installed unless they provide a minimum of 1 ft-candle (10.8 lux) of illumination within the exit enclosure measured at the walking surface.

NFPA 101- 2012 Edition
4.6 General Requirements.
4.6.1 Authority Having Jurisdiction.
4.6.1.1 The authority having jurisdiction shall determine whether the provisions of this Code are met.

4.6.1.2 Any requirements that are essential for the safety of building occupants and that are not specifically provided for by this Code shall be determined by the authority having jurisdiction.
4.6.1.3 Where it is evident that a reasonable degree of safety is provided, any requirement shall be permitted to be modified if, in the judgment of the authority having jurisdiction, its application would be hazardous under normal occupancy conditions.

4.6.1.4 Technical Assistance.
4.6.1.4.1 The authority having jurisdiction shall be permitted to require a review by an approved independent third party with expertise in the matter to be reviewed at the submitter's expense. [1:1.15.1]

4.6.1.4.2 The independent reviewer shall provide an evaluation and recommend necessary changes of the proposed design, operation, process, or new technology to the authority having jurisdiction. [1:1.15.2]

4.6.1.4.3 The authority having jurisdiction shall be authorized to require design submittals to bear the stamp of a registered design professional. [1:1.15.3]
Bedroom Egress Windows
ABC Sentences 9.10.14.4.(3)&(4) & 9.10.15.4.(3)&(4)

Question #1
How are SCO’s interpreting this clause? What if the bedroom window is larger than 0.35 m²?
A response provided by NRC on this question has confirmed that a bedroom window larger than 0.35 m² such as a slider window would still meet the intent of sentence (3) and would be permitted to be used. However, in discussion with a representative from the NRC, it is not the intent that the window would be a large window. The egress opening as well as the remaining window pane should be constructed as close to the 0.35 m² size as possible. For example, a window with an opening area meeting 0.35 m² and with a fixed window area of a similar size area to 0.35 m² would meet the intent of the exemption.

Question #2
Is this sentence saying that any number of bedroom egress windows need not be considered, and can they be within 2 m horizontally and vertically of another opening?
The exemption noted within sentence (4) permits the egress windows referred to in sentence (3) to be placed closer than 2 m horizontally and 2 m vertically to other unprotected openings.

Background Information:
2014 Alberta Building Code
requirements
9.10.14.4. Openings in Exposing Building Face
3) Except for buildings that are sprinklered and for openable windows having an unobstructed opening equal to 0.35 m² installed in accordance with Sentences 9.9.10.1.(1) and (2), where the limiting distance is 2 m or less, individual unprotected openings shall be no greater than
a) the area stated in Table 9.10.14.4.B., or
b) where the limiting distance is equal to or greater than 1.2 m, the area calculated by

\[ \text{Area} = 0.24 (2 \times \text{LD} - 1.2)^2 \]
4) The spacing between individual unprotected openings described in Sentence (3) that serve a single room or space described in Sentence (5) shall be not less than
a) 2 m horizontally of another unprotected opening that is on the same exposing building face and serves the single room or space, or
b) 2 m vertically of another unprotected opening that serves the single room or space, or another room or space on the same storey.

9.10.15.4. Glazed Openings in Exposing Building Face
3) Except for buildings that are sprinklered and for openable windows having an unobstructed opening equal to 0.35 m² installed in accordance with Sentences 9.9.10.1.(1) and (2), where the limiting distance is 2 m or less, individual glazed openings or a group of glazed openings in an exposing building face shall not exceed 50% of the maximum allowable aggregate area of glazed openings determined in Sentence (1).

4) The spacing between individual glazed openings described in Sentence (3) serving a single room or space described in Sentence (5) shall be not less than
a) 2 m horizontally of another glazed opening that is on the same exposing building face and serves the single room or space, or
b) 2 m vertically of another glazed opening that serves the single room or space, or another room or space on the same storey.

2010 NBC User’s Guide
Areas and Spacing of Individual Openings (NBC Sentences 9.10.14.4.(3) & 9.10.15.4.(3))
Because the requirements that limit the maximum opening areas assumed that smaller openings would be evenly distributed over the exposing building face, the NBC also limits the area of individual openings and their proximity to one another wherever the limiting distance is 2m or less. Exceptions are provided for sprinklered buildings and for openable bedroom windows with an unobstructed openable area of 0.35 m² where the window is installed to fulfill the requirements in NBC Subsection 9.8.10. for emergency egress.

NRC Response
Re: 2010 NBC and 2014 ABC Articles 9.10.14.4.(3) & 9.10.15.4.(3)
Dear Ms. Martin:
Sentence 9.9.10.1.(1) generally requires every bedroom in an unsprinklered suite to have at least one window or door opening to the outside that is large enough and easy enough to open so that it can be used as an exit in the event that a fire prevents use of the building’s normal exits.

Sentence 9.9.10.1.(2) states that the window referred to in Sentence 9.9.10.1.(1) shall
a) provide an unobstructed opening of not less than 0.35 m² in area with no dimension less than 380 mm, and
b) maintain the required opening during an emergency without the need for additional support.

"unobstructed opening equal to 0.35 sq m...." means the minimum unobstructed opening specified for escape. If a window utilizes a slider style window, the overall glazed window area would have to be larger.

The intent of Sentence 9.10.15.4.(3) is to exempt those bedroom windows from the restrictions stated in the Sentence.
Radon Mitigation Systems

Question:
Termination/intakes/windows/doors/piping materials: looking for clarity on piping materials and clearance to openings that may or may not be a source of potential contamination.

ABC requirements only speaks to the rough-in installation of the subfloor depressurization radon mitigation system, minimizing the potential entry of radon gas if the building is exposed to more that the suggested safe level of 200 becquerels per cubic meter.

Should a homeowner or builder install a radon mitigation system, the system design may utilize the design considerations provided in the “Reducing Radon Levels in Exitng Homes: A Canadian Guide for Professional Contractors” document as a best practice reference.

http://www.radonleaders.org/sites/default/files/HC%20Rn%20Mitigation%20Guide%20English_0.pdf

Venting of a radon mitigation system, although not specifically addressed within the ABC, would be interpreted as being similar to that of any typical exhaust device, and should be provided with the same clearances to intake openings as these other vents are required to provide. The NRC User’s Guide provides information that a 3m clearance should be used, however a clearance of this magnitude would not be in keeping with the previously accepted clearances provided for other venting appliances within the ABC and the B149.1 Natural Gas and Propane Instillation Code.

Background Information:
2014 Alberta Building Code
9.32.3.13. Outdoor Intake and Exhaust Openings
3) The distance separating air intakes from building envelope penetrations that are potential sources of contaminants, such as gas vents or oil fill pipes, shall be not less than 900 mm (3 feet).

Illustrated User’s Guide NBC 2010 Part 9 Housing and Small Buildings
Extending the Vent Pipe
The extension of the pipe should be at least 100mm (4") in diameter and should be insulated to minimize condensation. If the pipe discharges independently through the roof, it should be located not less than 3m (9’10") from any other opening and extend not less than 300mm (12") above the roof’s surface.
Alternatively, the pipe can discharge through an attic gable or an exterior wall. In the latter case, because the exhausted air may contain unacceptable concentrations of radon, re-infiltration of exhausted air into occupied space should be avoided by locating the discharge pipe not less than 300mm (12") above grade, not closer than 3m (9’10") from any other opening.

Standata G-01-10(Rev1)
See Attached
Reducing Radon Levels in Existing Homes: A Canadian Guide for Professional Contractors

In-line centrifugal fans specifically designed for radon mitigation are now available. Some air-tight fan designs are available with sealed joints; some have the casing joints and electrical connections located on the suction side of the fan, so leakage from the fan is not a concern. Plastic plumbing pipe is now used routinely for the suction and exhaust ducting, with air-tight solvent welded joints in the piping and air-tight rubber plumbing couplers to the fan.

As properly installed fans and ducting will not leak soil air and radon into the building, the fan no longer needs to be located outside the building envelope, but can be mounted inside the building.

Piping
The preferred piping is solvent welded 100 mm Schedule 40 PVC or ABS. This is used for domestic drain, waste and vent plumbing, and the pipe, fixtures, and the skills to install the piping are readily available. A lighter Schedule 20 pipe is available, and is satisfactory where the pipe is unlikely to be damaged. The Plumbing Code can be used as a guide to installation. Systems can use 75 mm pipe in tight spaces, but the pressure drops and air noise will be higher. The fan sizing can be adapted for different pipe sizes by calculating the air velocity and Vp (dynamic head) for each section of pipe.

Labelling
An information label should be placed on the system piping in a prominent location indicating that it is part of a radon mitigation system. Similar labels should be placed on the service panel circuit breaker, fan disconnect switch, and sump pit covers. A label warning that the membrane is part of a radon mitigation system should be placed at the entrance to any space where sub-membrane Depressurization is in use.

Venting
Building codes reference standards that specify limits as to the termination of through-wall vents serving appliances that exhaust combustion products. The discharge from radon mitigation systems should be located similarly. Fan calculation (design suction/design airflow) will need to be determined. In most moderate size houses with granular fill beneath the floor slab, and no large air leaks into the sub-slab fill from the house or outdoors, a 40 to 60 watt "radon fan" will be large enough to produce the needed flows and pressures to effectively reverse the flow of soil gas from in to out of the house. However, if the house footprint is large, there are inaccessible openings in the floor slab, the soil highly porous, the sub-slab fill divided by footings, or the fill has high resistance to air movement; a higher power "radon fan" with larger flow or suction capacity may be needed.

Each fan-powered system should have a method to monitor fan performance. Examples include fan suction indicators such as manometers, gauges, switched electrical pressure sensors with warning light, and electrical power or amperage gauges. An alternative, particularly with indoor fans, is to provide a continuous radon monitor in the living area, which will monitor the system performance.

Intakes
Subsection 9.32.3. of the 2014 ABC deals with Heating-season Mechanical ventilation. Therefore the requirements for "air intakes" as described in Subsection 9.32.3. apply only to intake terminals serving the mechanical ventilation systems (e.g. those connected to furnaces, HRVs, make-up air units etc.). The 900 mm requirement stipulated under sentence 9.32.3.13.(3) does not apply to doors or windows.

Wiring
All wiring should comply with the relevant electrical codes, and electrical components should be CSA or UL listed or equivalent. Good practice dictates that the fan disconnect switch or plug should be within eyesight of the fan. An exterior fan should be hardwired to an internal junction box, with external wiring in conduit. No fan wiring should be run inside the suction or discharge piping or inside HVAC ducts.

There is a Standata in the works with respect to this. There are different approaches which can be taken, especially between local municipalities. The mitigation method chosen is influenced by the reduction in radon concentration required, the building type, and the costs associated with the method, including the running (energy) costs and the cosmetic aspects of the installation. A fan should be installed so that the flow is vertical, so that any condensation in the system will drain through the fan, rather than pooling in the casing.
SIDEWALL VENT TERMINATIONS

This bulletin has been jointly developed by Safety Services and the Gas Sub-Council to inform designers, vendors, builders, contractors and owners of the minimum code requirements to ensure safe and effective venting of gas-fired appliances.

Traditionally, gas appliances were designed with a draft hood or a draft diverter and depended on natural buoyancy to effectively vent products of combustion to the outdoors through the roof. Current efficiency requirements are resulting in more appliances with many different vent termination options. As the number of appliances being used in homes that have sidewall vent termination options increases, so has the issues with combustion products at those locations.

B149.1 – Natural Gas and Propane Installation Code

8.14.8 A vent shall not terminate
(a) where it may cause hazardous frost or ice accumulations on adjacent property surfaces;
(b) less than 7 ft (2.1 m) above a paved sidewalk or a paved driveway that is located on public property;
(c) within 6 ft (1.8 m) of a mechanical air-supply inlet to any building;
(d) above a regulator within 3 ft (900 mm) horizontally of the vertical centreline of the regulator vent outlet to a maximum vertical distance of 15 ft (4.5 m);
(e) except as required by Clause 8.14.8(d), any distance less than that of any gas pressure regulator vent outlet as detailed in Table 5.2;
(f) less than 1 ft (300 mm) above grade level;
(g) within the following distances of a window or door that can be opened in any building, of any nonmechanical air-supply inlet to any building, or of the combustion air inlet of any other appliance;
   (i) 6 in (150 mm) for inputs up to and including 10 000 Btu/h (3 kW);
   (ii) 12 in (300 mm) for inputs from 10 000 Btu/h (3 kW) up to and including 100 000 Btu/h (30 kW); and
   (iii) 3 ft (900 mm) for inputs exceeding 100 000 Btu/h (30 kW); and
(h) underneath a veranda, porch, or deck unless
   (i) the veranda, porch, or deck is fully open on a minimum of two sides beneath the floor; and
   (ii) the distance between the top of the vent termination and the underside of the veranda, porch, or deck is greater than 1 ft (300 mm).
Note: Alberta Building Code 2014 states:

9.32.3.13. Outdoor Intake and Exhaust Openings

3) The distance separating air intakes from building envelope penetrations that are potential sources of contaminants, such as gas vents or oil fill pipes, shall be not less than 900 mm (3 feet).

8.14.8(a) is an objective requirement that has no reference to caps, directional diversion, property line or building separations.

The issues that could be affected by frost and ice accumulations due to side yard vent terminations include adjoining property air inlets, appliance performance, windows, doors, building openings, property surfaces, mould, and moisture.

The items to consider for side wall vent terminations are:
1. Vents from category III or category IV appliances or appliances with special venting systems exceeding 35 000 Btuh.
2. Appliances that have some means of redirecting the exhaust plume.
3. Measurements
   (a) unobstructed distances to property lines of less than 4ft. (1.2m),
   (b) distances of 4 ft. (1.2m) and up to 8 ft. (2.4m), and
   (c) distances beyond 8 ft. (2.4m).
4. Alcove installations.

Sidewall Vent terminations require;

- A vent from a category III or category IV appliance or an appliance with a special venting system exceeding 35 000 Btuh shall not extend through an exterior wall and terminate adjacent to the exterior wall unless there is a minimum unobstructed distance of 4 ft. (1.2m) or greater from the foundation to the property line.
- A vent from a Category III or Category IV appliance or an appliance with a special venting system exceeding 35,000 Btuh that terminates into a side yard which measures not less than 4 ft. (1.2m) from the foundation wall to property line, shall have a means of redirecting the vent plume with a certified fitting such as a “T”, a 90 degree elbow, or termination acceptable to the Authority Having Jurisdiction, installed in accordance to the manufacturer’s installation instructions.
- Distances greater than 8 ft. (2.4m) will have no restriction.
- In an alcove installation the depth of the vent termination from the exterior face cannot exceed the separation between the two opposing walls.

Note: These requirements do not apply to locations where adjoining properties are public spaces such as road ways, alleyways, walkways or parks where structures would not normally be erected.
Rationale

- Revised to better reflect installation variations and concerns expressed by inspectors and contractors. Addresses all sidewall vented appliances not just category IV. Allows for unrestricted side terminations of special vent systems up to 35,000 Btuh. Appliances with less than 4 ft. (1.2m) clearance, which should cover such appliances as fireplaces and garage heaters under 35,000 Btuh which usually have shorter run times and not a lot of plume production.
- Appliances over 35,000 Btuh, venting within side yards with a width of not less than 4 ft. (1.2m) can be installed with discharge directed away from property lines. Most appliances allow for directional fittings and others already have termination caps such as on garage heaters and boiler venting. Appliances such as power vent water heaters over 35,000 Btuh are being used more and more for some space heating which increases run times and hence exhaust plumes. They need adequate space for proper plume dispersal and 4 ft. (1.2m) side yard terminations have resulted in numerous issues.
- Finally, as the note indicates, open public spaces adjoining the properties are exempt from the requirements.
Use this Section to specify a radon mitigation rough-in system, as listed below.

The radon mitigation rough-in system is to be designed, inspected, photographed and tested by a Canadian National Radon Proficiency Program (C-NRPP) Certified Mitigation Professional, obtained by the Prime Consultant.

Alberta Infrastructure has mandated the rough-in system in new Government of Alberta owned and supported permanent buildings, with the qualification that our department be open to alternative solutions proposed by the Certified Mitigation Professional. The "rough-in" is considered the benchmark. A roughed-in suction pit and cage sub-slab depressurization method is to be used for the system.

Edit, remove from or add to this Section in consultation with Alberta Infrastructure- Technical Services Branch- Building Environment Unit specialists in radon control procedures (Phone: 780-422-7472, 780-422-7600 and 780-422-7440).

This Master Specification Section contains:

.1 This Cover Page

.2 Specification Section Text:

1. General
   1.1 Intent
   1.2 References
   1.3 Administration Requirements
   1.4 Delivery, Handling and Storage
   1.5 Environmental / Site Conditions
   1.6 Warranty
   1.7 Performance Requirements
   1.8 C-NRPP Inspection Requirements

2. Products
   2.1 Manufacturer
   2.2 Geotextile Fabric
   2.3 Gas Permeable Venting Layer
   2.4 Membrane Barrier System
   2.5 Suction Pit and Cage
   2.6 Collection Pipe Extensions from the Suction Pit and Cage

3. Execution
   3.1 Installation
1 General

1.1 INTENT

.1 This section describes the minimum requirements for the supply and installation of a radon mitigation rough-in system.

.2 The radon rough-in system is to be designed, inspected, photographed and tested by a Canadian National Radon Proficiency Program (C-NRPP) Certified Mitigation Professional, obtained by the Prime Consultant.

.3 If, after the building is completed and occupied, long term radon testing results indicate the rough-in system needs to be activated, the installed components provide radon gas extraction points from within the building. Follow Health Canada guidelines for long term radon testing. The Building Owner would then need to extend the extraction points to the outside of the building and mechanically vent the radon to the outside, so that radon levels are controlled within the building.

.4 If the system is activated, it must be capable of reducing and maintaining the radon concentration to as low as practicable below 200 Becquerels per cubic metre (Bq/m³) within the building, as per Health Canada guidelines.

1.2 REFERENCES

.1 Alberta Building Code 2014.


.3 ASTM applicable standards.


1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Installation Meeting:

.1 Contractor to arrange for a site meeting with the (C-NRPP) Certified Mitigation Professional to review existing conditions and all requirements related to materials, material handling and storage, installation, scheduling, testing, and quality assurance and control, to confirm compliance with manufacturer and installation requirements.
.2 Submittals:
  .1 Submit component product information to the (C-NRPP) Certified Mitigation Professional related to the system design drawings and specifications. This includes the geotextile fabric, gas permeable venting layer, membrane barrier system, suction pit and cage, collection/extension/riser piping, and sealing methods for the slab perimeters and penetrations.
  .2 Provide final as-building drawings to the (C-NRPP) Certified Mitigation Professional that indicate the final locations of the collection/extension/riser pipes and the suction pits and cages.

.3 Quality Control:
  .1 Component installation for the radon mitigation rough-in system is to be done by competent and skilled workers having a minimum of two (2) years experience installing vapour barriers, sealants and waterproofing membranes.
  .2 Installation workers are also to obtain appropriate training on radon mitigation systems from the (C-NRPP) Certified Mitigation Professional and the component product manufacturers.
  .3 (C-NRPP) Certified Mitigation Professional to have on-going meetings with the Contractor to discuss and confirm compliances with the system design drawings and specifications.

1.4 DELIVERY, HANDLING AND STORAGE
  .1 Ensure all products delivered to the site meet manufacturer’s quality requirements. Remove and do not use any defective products. Store and handle materials as per manufacturer’s requirements, recommendations and safety data sheets. Protect materials from construction and weather related damage using appropriate coverings and adequate ventilation.

1.5 ENVIRONMENTAL / SITE CONDITIONS
  .1 All products and materials are to be stored at temperatures and environmental conditions that conform to manufacturer guidelines.
  .2 Perform installation work only when the weather conditions are within installation guidelines established by manufacturer.
  .3 Do not proceed with membrane barrier system installation until confirmation by the (C-NRPP) Certified Mitigation Professional that the substrate preparation and condition is suitable.
.4 Do not proceed with the concrete slab pour until confirmation by the (C-NRPP) Certified Mitigation Professional that the membrane barrier system preparation and condition is suitable.

1.6 **WARRANTY**

.1 Provide a two (2) year warranty against slab perimeter and penetration sealing defects and/or deficiencies, and confirm that the materials meet performance specifications and installation requirements.

.2 Review all manufacturer’s requirements for warranty period before the commencement of work. Ensure that all materials and installations are in conformance with manufacturer and warranty requirements, system design, and requirements of this specification.

.3 All slab perimeter and penetration sealing defects and/or deficiencies that occur within the warranty period are to be corrected promptly by the Contractor at no expense to the Building Owner and the Province.

1.7 **PERFORMANCE REQUIREMENTS**

.1 Installation of the geotextile fabric, gas permeable layer, suction pits and cages, collection/extension/riser pipes, membrane barrier system, and sealing methods for the slab perimeters and penetrations for the building concrete in contact with the soil, is to comply with manufacturers requirements, system design, and the requirements of this specification.

.2 All system components are to be chemically compatible with the soil environment (ASTM E154-88).

.3 The radon rock (gas permeable venting layer) is to be a minimum 100 mm layer of clean, coarse, aggregate meeting Size #5 specifications as defined in ASTM C33 / C33M - 16 Standard Specification for Concrete Aggregates, and as stated in the EPA/625/R-92/016 - 1994 Radon Prevention in the Design and Construction of Schools and Other Large Buildings document. Other venting types may be proposed by the Certified Mitigation Professional in the system design.

.4 The radon membrane barrier system (also is the vapour barrier) is to be a minimum, 10 mil polyolefin based resin sheet membrane, meeting the requirements of ASTM E 1745-11. Other membrane barrier systems may be proposed by the (C-NRPP) Certified Mitigation Professional in the system design.

.5 Radon membrane barrier system is to be overlapped and sealed at all perimeters and floor slab penetrations to provide a continuous seal of the building area in contact with the soil, as per manufacturer requirements, system design, and the requirements of this specification.

### 1.8 C-NRPP INSPECTION REQUIREMENTS

.1 Four (4) inspections of the system components and rough-in installations will be performed by a (C-NRPP) Certified Mitigation Professional. The results of these activities will be photographed and documented in written inspection reports prepared by the Professional and provided to the Building Owner and Province.

.2 The inspections are as follows:

.1 The (C-NRPP) Certified Mitigation Professional will inspect and document all relevant materials and products brought to the site for the purposes of radon mitigation rough-in system (1st inspection).

.2 The (C-NRPP) Certified Mitigation Professional will inspect, document and approve the completed installation of collection/extension/riser pipes, suction pits and cages and gas permeable venting layer, prior to the membrane barrier installation (2nd inspection).

.3 The (C-NRPP) Certified Mitigation Professional will inspect, document and approve the integrity of the membrane barrier system. They are also to conduct depressurization testing of the membrane barrier system after completed installation, prior to the concrete slab pour over the membrane to seal it (3rd inspection and testing).

.4 The (C-NRPP) Certified Mitigation Professional will inspect, document and approve the completed installation of slab perimeter and penetration sealing and capping and labeling of the riser pipes, once the concrete slab pour is completed (4th inspection).

### 2 Products

#### 2.1 MANUFACTURER

.1 No specific product manufacturers for the radon mitigation rough-in system are identified. All products shall conform to the applicable ASTM standards and the EPA/625/R-92/016 - 1994 technical design document, and as indicated in the design drawings and specifications. Materials and components included for use are to be approved by the (C-NRPP) Certified Mitigation Professional.

#### 2.2 GEOTEXTILE FABRIC

.1 The geotextile fabric is to be installed on the subsoil below the radon rock gas permeable venting layer. The geotextile fabric protects the gas venting layer from being contaminated with fines from the subsoil. Other geotextile fabric layers can be proposed by the (C-NRPP) Certified Mitigation Professional in the system design.
.2 The geotextile fabric is to have the following physical characteristics:
   .1 Non-woven fiber construction with an apparent opening size of 0.15mm.
   .2 Unit weight of 340g/m² (ASTM D5261)
   .3 Grab tensile strength of 1100 N (ASTM D4632).
   .4 Elongation of from 45 to 105% (ASTM D4632).
   .5 Trapezoid tear resistance of 450N (ASTM D4533).
   .6 Puncture resistance of 700N (ASTM D4833).
   .7 Mullen Burst of 3600Pa (ASTM D3786).

2.3 GAS PERMEABLE VENTING LAYER

   .1 The gas permeable venting layer (radon rock) is to be a minimum 100 mm layer of clean, coarse, aggregate meeting Size #5 specifications as defined in ASTM C33 / C33M - 16 Standard Specification for Concrete Aggregates, and as stated in the EPA/625/R-92/016 - 1994 Radon Prevention in the Design and Construction of Schools and Other Large Buildings document. Other types of venting layers may be proposed by the (C-NRPP) Certified Mitigation Professional in the system design.

2.4 MEMBRANE BARRIER SYSTEM

   .1 The radon membrane barrier system (also the vapour barrier) is to be a minimum, 10 mil polyolefin based resin sheet membrane, meeting the requirements of ASTM E 1745-11. Other membrane barrier systems may be proposed by the (C-NRPP) Certified Mitigation Professional in the system design.

   .2 All membrane seams are to be prepared, overlapped and sealed as per the manufacturer’s recommendations.

   .3 Supply and install Blueskin WP 200, or an approved alternative by the (C-NRPP) Certified Mitigation Professional, as a transition between the radon membrane and upturn onto grade beams, foundation walls, footings or any item that penetrates the finished floor slab. Joints are to be designed to accommodate anticipated movement.

   .4 The membrane is to be terminated with an upturn at the perimeter grade beams, foundation walls, footings and strip footings, and terminate between the beam, wall or footing and finished floor slab. Membrane is to terminate midway through the floor slab and be sealed and secured using Blueskin Termination Bar, mechanically fastened to the beam or footing on 300mm centers. Sealant to be applied to junction between membrane to footing, wall or beam, above Termination Bar.
Gas tight seals are to be provided around the surfaces of all vertical penetrations. Such surfaces are to be prepared as per manufacturer’s requirements to facilitate membrane adherence. Use Blueskin WP 200, sealants and construction tape as required to provide a continuous seal between radon membrane and any pipe, conduit or other item that penetrates the floor slab.

Once concrete floor slab has cured sufficiently to allow work to proceed on it, apply sealant to all penetration junctions on the top side of the finished floor slab.

2.5 SUCTION PIT AND CAGE

The suction pits and cages are to be designed by the (C-NRPP) Certified Mitigation Professional. This method exposes void areas in the gas permeable venting layer to facilitate depressurization, if required.

The suction pit area is to be sized to fit a galvanized metal suction pit cage. The cages are used to prevent the gas permeable venting layer from entering the suction pits.

Ensure that a vertical collection riser pipe extends from the suction pit and cage to 300 mm above the finished floor slab. Horizontal collection/extension pipes may be required in the system design.

2.6 COLLECTION, EXTENSION AND RISER PIPES

The collection, extension and riser pipe locations are to be designed by the (C-NRPP) Certified Mitigation Professional, and shown on the design drawings. Collection pipes are to be placed into the clear granular material / gas permeable venting layer having a minimum, thickness of 100mm.

The collection, extension and riser pipes are to consist of a minimum Schedule 40 non-perforated smooth walled 100mm (inside) diameter rigid pipe of PVC, High Density PE or ABS construction.

The collection, extension and riser pipes are to be installed in accordance with the EPA/625/R-92/016 - 1994 Radon Prevention in the Design and Construction of Schools and Other Large Buildings document.

A single vertical riser pipe is to be installed at each suction pit and cage location and extend from the suction pit and cage to 300mm above the finished floor slab.

The system design by the (C-NRPP) Certified Mitigation Professional may use collection piping or sleeves to draw radon gas from multiple sub-slab areas to a single suction pit, to minimize the number of suction pits. This would require holes to be created, as shown in the design, through the perimeter grade beams, foundation walls, footings and strip footings to allow piping to run through.
3 Execution

3.1 INSTALLATION

.1 Contractor to review footing, wall and grade beam building construction drawings, and review radon mitigation rough – in system design drawings and specifications to ensure proper understanding before installation. Discuss with the (C-NRPP) Certified Mitigation Professional as required.

.2 All installation work is to be inspected and documented by the (C-NRPP) Certified Mitigation Professional.

.3 Each individual sub-slab area isolated by building footings, foundation walls or grade beams is to be connected to an installed radon roughed-in mitigation system. The system design may use collection piping to draw radon gas from multiple sub-slab areas to a single suction pit, to minimize the number of suction pits.

.4 Prepare sub-grade surface prior to installation of the geotextile fabric, suction pits and cages, and collection, extension and riser piping, as per the elevations specified in the building construction drawings and radon mitigation rough – in system design drawings and specifications.

.5 Place geotextile fabric layer over the entire sub-grade surface, with sufficient overlaps as per the manufacturer’s requirements.

.6 Construct and install the suction pits and cages as close to the center of the sub-slab area as practicable, as per the radon mitigation rough – in system design drawings and specifications and manufacturer’s requirements.

.7 Install collection/extension/riser pipes in locations as per the radon mitigation rough – in system design drawings.

.8 The collection pipes are to be placed within the gas permeable venting layer.

.9 All pipe joints are to be solvent welded and fully inserted into coupling or fitting to ensure joint integrity as per manufacturer’s instructions.

.10 If the riser pipe penetrations through the floor slab cannot be installed in the center of the sub-slab area, an extension pipe must be installed so that it extends from the center of the suction pit and cage to the preferred pipe slab penetration location.
Riser pipe floor slab penetrations are not to interfere with planned future use of the interior space. Confirm riser pipe penetration locations with the C-NRPP Mitigation Professional on site prior to installation.

The space around the riser pipe installations must be considered for possible future pipe extensions. Future exterior exhaust locations are to be located a minimum of 2.0 meters from any opening in the building or adjacent building.

Riser pipe installations are to ensure the same sized exhaust pipe extensions can be made to the exterior of the building through the wall or roof system, if required in the future.

The gas permeable venting layer (radon rock) is to be a minimum 100 mm layer of clean, coarse, aggregate meeting Size #5 specifications as defined in ASTM C33 / C33M - 16 Standard Specification for Concrete Aggregates, and as stated in the EPA/625/R-92/016 - 1994 Radon Prevention in the Design and Construction of Schools and Other Large Buildings document.

The gas permeable venting layer (radon rock) is to be constructed by placing, grading and compacting (if required structurally) it over the entire sub-grade surface, geotextile layer and collection/extension/riser piping. Ensure the suction pit and cage area remains clear of the gas permeable venting layer (radon rock).

At completion of the substrate, component and gas permeable venting layer installation has been provided by the (C-NRPP) Certified Mitigation Professional, the membrane barrier system construction can commence.

Membrane barrier system is to be placed over the gas permeable venting layer (radon rock). All membrane overlaps and sealing is to be done as per the manufacturer's requirements and specifications.

Membrane barrier system installation is to be performed by trained qualified installers using manufacturer's recommended techniques and equipment.

Membrane barrier system is to be a minimum, 10 mil polyolefin based resin sheet membrane, meeting the requirements of ASTM E 1745-11.

Membrane barrier system is to be installed and sealed around all vertical penetrations with sufficient overlap and using Blueskin, sealant and construction tape or chemical welded seams as per manufacturer's requirements and specifications. An approved alternative to the Blueskin may be made by the (C-NRPP) Certified Mitigation Professional in the system design drawings and specifications.
.22 At completion of the membrane barrier system, Contractor is to contact the (C-NRPP) Certified Mitigation Professional to inspect the integrity of the membrane barrier system and conduct depressurization testing of the system. Results are to be documented by the (C-NRPP) Certified Mitigation Professional.

.23 When acceptance of the radon mitigation rough-in system installation has been provided by the (C-NRPP) Certified Mitigation Professional, the floor slab construction can commence.

.24 Care must be taken not to puncture the membrane excessively during floor slab construction. To limit membrane puncture during floor slab construction, items such as rebar chair supports designed with a wide base (instead of legs) are to be used to better spread the rebar load.

.25 Once concrete floor slab has cured sufficiently to allow work to proceed on it, clean joint surfaces in accordance with manufacturer’s instructions and seal all finished floor slab perimeter cold joints and any other floor slab penetration junctions between dissimilar materials using high quality sealants suitable for use on each subject material surface. Test sealant to confirm adhesion with all surfaces prior to use. Joints are to be pre-designed to accommodate anticipated movement.

.26 The above slab exposed open top of the riser pipes must be capped and 100% solvent welded to provide a complete seal.

.27 The above slab exposed riser pipe and cap are both to be labeled to identify them as part of the “Radon Mitigation Rough-in System”.

.28 At completion of the slab perimeter and penetration sealing and capping and labeling of the exposed riser pipes, Contractor is to contact the (C-NRPP) Certified Mitigation Professional to conduct feasibility and fan flow estimate tests (please refer to Chapter 4, Health Canada – Reducing Radon Levels in Existing Homes: A Canadian Guide for Professional Contractors). Results are to be documented by a (C-NRPP) Certified Mitigation Professional.

.29 When acceptance of the installation of the slab perimeter and penetration sealing and capping and labeling of the exposed riser pipes has been provided by the (C-NRPP) Certified Mitigation Professional, the passive radon mitigation rough-in system is considered complete.

.30 Deficiencies in the radon mitigation rough – in system are to be corrected in accordance with this specification and as per instructions from the (C-NRPP) Certified Mitigation Professional.

END OF SECTION
Fire Alarm Systems Verification

Question?
3.2.4.5.(2) and CAN/ULC-S537-13. Proper format for verifications reports and acceptability?
There is documentation within the standard which provides a template example of the
documentation which could be used for the verification report. This is only an example,
and variations of it would also be acceptable.

Background Information:
2014 Alberta Building Code requirements:
3.2.4.5. Installation and Verification of Fire Alarm Systems
2) Fire alarm systems shall be verified in conformance
with CAN/ULC-S537, “Verification of Fire Alarm Systems,”
to ensure they are operating satisfactorily.

Getting Full Value and Safety From Fire Alarm Verifications
One of the most important points in the life safety cycle of
a building is the verification of the Fire Alarm System as
required after building construction or additions to the fire
alarm system. Unfortunately, it is also one of the most
misunderstood processes in that cycle by designers, installers, technicians and owners. This
lack of understanding by those responsible creates significant problems for building and fire
safety codes officers and may endanger the public.

One of the reasons for this concern is that the fire alarm system is almost invisible and is
therefore taken for granted by most occupants or users. If a building was commissioned and
occupied without a working plumbing, heating, electrical, or data system, the occupants would
quickly complain. When the keystone life safety system in a building is not operating or not fully
functional, few people, beyond perhaps the building operator, will necessarily be aware.

Verification of the fire alarm system happens at the end of the construction schedule. At this
time, there is often significant pressure from the general contractor, the coordinating
professional, the owner, tenants, and others to get into the building, and the fire alarm
verification process is seen as an obstacle rather than the critical quality, reliability and
effectiveness control process it is meant to be. Too often the registered engineering professional
or their representative, the fire alarm technicians, and the electricians are pushed to “just get it over with.” This pressure, sometimes compounded by the costs of verification
being underpriced in the original bid process, can potentially result in a rushed verification. A
rushed job can mean that shortcuts are taken, and that assumptions are made and then
improperly translated into “facts” in the verification report, which may then be signed and sealed
by a registered engineering professional and submitted to the Building SCO as part of the
required schedules. If the registered engineering professional doesn’t review the verification
report in detail, these “rushed facts” are not evaluated and the critical life safety system in the
building—a system which, when designed, installed, and verified properly, would have a
reliability and effectiveness rate of over 99 per cent—can no longer be relied upon to the same
degree.

In short, the fire alarm installation and verification process is designed with checks and balances
specifically because these systems are critical. If everyone does their job well, successful
systems are virtually guaranteed. If somebody misses any of their responsibilities, systems will
fail, problems will be created, and in the worst possible extreme scenario, people may die. A
documented instance when these errors and omissions have occurred placed sleeping residents in significant danger and resulted in ongoing legal action. Fortunately no one was injured during this event.

The expectation of the Safety Codes Act, the Alberta Building Code 2014, and CAN/ULC-S537-13 "Verification of Fire Alarm Systems" is that the forms laid out in Appendix C have been followed and completed exactly, and in their entirety. This is what the Building SCO anticipates and expects. They (SCO’s) may not always go through a verification report line by line to make sure those who prepared and approved the report did not delete, alter, or modify anything. They may reasonably rely upon and accept the work of those responsible in good faith and at face value. Only if everyone completes the entire report without modifying will it meet the legal requirements set out by the Safety Codes Act and the Alberta Building Code (and sometimes the Alberta Fire Code).

Unfortunately, some companies, engineers, and technicians seem to be of the belief that they can alter or modify the forms in Appendix C (S537). Altering the forms in any way that changes wording or order, or that eliminates any section, creates a violation of the Safety Codes Act and a potential liability to those involved.

However, if a company sets up a template on its own letterhead which covers everything in Appendix C, with the exact wording, referencing, and sequencing, and does the same for Building Code STANDATA 06-BCI-001-R1 Appendix A, again with the exact same information, wording, referencing, and sequencing, those forms would be acceptable when fully and completely filled out by, and under, the direction of the registered engineering professional and then signed and stamped by that registered engineering professional. The template must not change or remove anything.

While it is understood that the registered engineering professional does not usually directly "perform" the verification (and should not be operating the fire alarm equipment unless qualified to do so), it is expected that they direct and supervise the verification, preferably on site or through a competent and qualified person, and that they review the results and confirm all documentation prior to creating and submitting the full report and certificate to the Building SCO or through the coordinating professional. The owner is required to receive a copy of the report as well, which is required to remain available on site, for review by SCOs and service personnel, for the life of the fire alarm system.

Any changes, reordering, omissions, and inconsistencies from the required format that are made by those responsible, and the resulting non-compliance with code requirements and expectations, are not the responsibility of the Safety Codes Officer to find or fix. The responsibility for compliance lies with those who conduct and sign off on the verification on behalf of the owner.

Verification reports are usually accepted by SCOs in good faith, without reviewing them in detail, based upon the assumption and reasonable expectation that the registered engineering professional submitting the verification report has confirmed that all the required work has been completed and it has all been fully recorded on all the correct forms. The importance of the engineer's involvement here cannot be overstated.

The Safety Codes Officer needs to ensure that they are asking for and receiving a full and complete verification report for themselves and their employer which evidences the proper completion of required work and documentation by the responsible individuals. Those who conduct verifications are encouraged to focus on the importance that the safety codes system places upon their work, so that the overall state and quality of verification of fire alarm systems in Alberta can be increased. Fire alarm systems are the primary life safety systems in many buildings. Ensuring that they are verified properly will better assure the safety of all Albertans.
# APPENDIX C (INFORMATIVE) – FIRE ALARM SYSTEM VERIFICATION RECORDS

(Reference: Subsection 4.1, Clauses 4.1.7, 4.2.1 and 4.2.2)

## C1 FIRE ALARM SYSTEM VERIFICATION REPORT

(Reference: Clauses 4.1.6 and 4.2.2)

<table>
<thead>
<tr>
<th>Building name:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
<td></td>
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<tr>
<td>System manufacturer:</td>
<td>Model number:</td>
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<p>| | | |</p>
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<tr>
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<tbody>
<tr>
<td><strong>A</strong></td>
<td>System provides single-stage operation.</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>B</strong></td>
<td>System provides two-stage operation.</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>C</strong></td>
<td>The entire fire alarm system has been verified in accordance with CAN/ULC-S537, Standard for Verification of Fire Alarm Systems.</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>D</strong></td>
<td>This is a partial verification for a partial occupancy.</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>E</strong></td>
<td>This is a partial verification for a fire alarm system that has been replaced in stages.</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>F</strong></td>
<td>This is a verification of a portion of an existing fire alarm system verified in accordance with Section 7, System Modifications.</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>G</strong></td>
<td>Installed in accordance with the design and CAN/ULC-S524, Standard for Installation of Fire Alarm Systems.</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>H</strong></td>
<td>The fire alarm system documentation is on site and includes a description of the system.</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>I</strong></td>
<td>The fire alarm system is fully functional.</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>J</strong></td>
<td>The fire alarm system is connected to a fire signal receiving centre. If connected, indicate the fire signal receiving centre:</td>
<td>Yes</td>
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<tr>
<th><strong>K</strong></th>
<th>Comments</th>
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</table>

| **L** | A copy of this report will be given to the following, who is the owner or owner's representative for this building: | Yes  | No  |

This is to certify that the information contained in this Fire Alarm System Verification Report is correct and complete.
C2 DOCUMENTATION

(Reference: Clause 4.2.3)

YES □ = Tested Correctly
NO □ = Did not test correctly
N/A □ = Not applicable
FUNCTION OR FEATURE NOT PROVIDED ON THIS FIRE ALARM SYSTEM

C2.1 Documentation for the fire alarm system is on site and includes the following description of the fire alarm system:

<table>
<thead>
<tr>
<th></th>
<th>Instructions for resetting the system and silencing alarm signals.</th>
</tr>
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<tbody>
<tr>
<td>A</td>
<td>Yes □</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Instructions for silencing the trouble signal and action to be taken when the trouble signal sounds.</th>
</tr>
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<tbody>
<tr>
<td>B</td>
<td>Yes □</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Description of the function of each operating control and indicator on the fire alarm unit.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>Yes □</td>
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<thead>
<tr>
<th></th>
<th>Description of the area or fire zone protected by each alarm detection circuit (this may be in the form of a list or plan drawing).</th>
</tr>
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<tbody>
<tr>
<td>D</td>
<td>Yes □</td>
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<thead>
<tr>
<th></th>
<th>Description of alarm signal operation.</th>
</tr>
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<tbody>
<tr>
<td>E</td>
<td>Yes □</td>
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</tbody>
</table>

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<thead>
<tr>
<th></th>
<th>Description of ancillary equipment controlled by the fire alarm system.</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>Yes □</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>In systems that provide logical control of a smoke control system, documentation is on site and includes a sequence of operation of the smoke control system.</th>
</tr>
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<tr>
<td>G</td>
<td>Yes □</td>
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</table>

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<tr>
<th></th>
<th>Building diagrams are on site that clearly indicate the type and location of all smoke-control equipment (fans, dampers, etc.).</th>
</tr>
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<tbody>
<tr>
<td>H</td>
<td>Yes □</td>
</tr>
</tbody>
</table>

C3 FIELD DEVICE AND RELATED CIRCUITS – TEST AND INSPECTION

(Reference: Clause 4.3.1.3, Subsections 4.3.1, 4.3.2, 4.3.3, 4.3.5 and 4.3.6)
| A | Correct field termination and wiring size. | Yes ☑ | No ☑ | N/A ☑ |
| B | Correct circuit polarities. | Yes ☑ | No ☑ | N/A ☑ |
| C | An open circuit fault on a conventional device circuit causes a trouble signal. | Yes ☑ | No ☑ | N/A ☑ |
| D | Removal of any active or supporting field device circuit causes a trouble signal. | Yes ☑ | No ☑ | N/A ☑ |
| E | One contact device and one non-contact device tested for operation and annunciation at the control unit or transponder, when using a field verifying device. | Yes ☑ | No ☑ | N/A ☑ |
| F | Class A circuits serving conventional field devices tested for the capability of providing an alarm signal on each side of an open circuit fault connection at an electrically remote point in the circuit. | Yes ☑ | No ☑ | N/A ☑ |
| G | Ground fault indications occur when tested at the electrically furthest field device, and do not result in normal to off-normal status change conditions. | Yes ☑ | No ☑ | N/A ☑ |
| H | Field device at the electrically furthest point from the power source (in every circuit) receives rated power in accordance with manufacturer's specifications. | Yes ☑ | No ☑ | N/A ☑ |
| I | Replaceable over-current devices are of correct rating. | Yes ☑ | No ☑ | N/A ☑ |
| J | On systems that employ power bus isolators, confirm that where a power bus circuit serves more than one fire alarm zone, a single fault (open circuit fault, short circuit fault or ground fault) on the power circuit does not prevent the normal operation of input or output field devices in more than one fire alarm zone. | Yes ☑ | No ☑ | N/A ☑ |
| K | Conductor type and wire gauge in accordance with equipment manufacturer's installation wiring at all system termination points. | Yes ☑ | No ☑ | N/A ☑ |
| L | Confirm that where the multiple strand optical fibre cable used with a fire alarm system is not dedicated to the fire alarm system, the fire alarm system shall continue to function as required despite any impairment to other systems, which share the cable. | Yes ☑ | No ☑ | N/A ☑ |
| M | Where power isolation modules are installed in a power distribution riser serving field devices, wiring shall be shorted on the isolated side, annunciation of the fault confirmed, and then a device on the source side shall be operated, and activation confirmed at the control unit or transponder. | Yes ☑ | No ☑ | N/A ☑ |
| N | Where a signal circuit serves more than one residential suite, a wire-to-wire short circuit fault shall be imposed within each suite in normal (supervisory-non-alarm) and alarm conditions. In all cases the wire-to-wire short circuit fault shall not interfere with the ability of devices in other dwelling units, public corridors, or suites to sound an alarm. | Yes ☑ | No ☑ | N/A ☑ |

**C4 DATA COMMUNICATION LINK TEST**

(Reference: Clause 4.2.6, Subsection 4.3.4)
### Control Unit or Transponder Location:

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A</strong> Each system abnormal condition specified in Table 1, Abnormal System Conditions, tested for each data communication link at the control unit or transponder.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><strong>B</strong> Tests for alarm and trouble received under a single ground fault condition conducted on each conductor of that data communication link independently.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><strong>C</strong> Each conductor in a data communication link, Class A (DCLA) tested for the capability of providing an alarm signal on each side of a single open circuit fault condition.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><strong>D</strong> Where a data communication link serves devices on more than one floor area, impose a wire-to-wire short circuit fault within each floor area and confirm receipt of trouble and alarm condition from another floor area.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><strong>E</strong> Where fault isolation modules are installed in data communication links serving field devices, wiring shorted on the isolated side, annunciation of the fault confirmed, and then a device on the source side operated, and activation confirmed at the control unit or transponder.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><strong>F</strong> Where fault isolation in data communication links is provided between control units or transponders, the field wiring shorted between each pair of control units or transponders, in turn, annunciation of the fault confirmed and operation outside the shorted section confirmed.</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

### C5 CONTROL UNIT OR TRANSPONDER RECORD

(Reference: Clause 5.1.1)

### C5.1 CONTROL UNIT OR TRANSPONDER TEST

(Reference: Clauses 4.2.4, 5.2.2.1)

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A</strong> Power 'ON' visual indicator operates.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><strong>B</strong> Common visual trouble signal operates.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><strong>C</strong> Common audible trouble signal operates.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><strong>D</strong> Trouble signal silence switch operates.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><strong>E</strong> Main power supply failure trouble signal operates.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><strong>F</strong> Ground fault tested for positive and negative indication initiates trouble signal.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><strong>G</strong> Alert signal operates.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><strong>H</strong> Alarm signal operates.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><strong>I</strong> Automatic transfer from alert signal to alarm signal operates.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><strong>J</strong> Manual transfer from alert signal to alarm signal operates.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><strong>K</strong> Automatic transfer from alert signal to alarm signal cancel (acknowledge) feature operates on a two-stage system.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><strong>L</strong> Alarm signal silence inhibit function operates.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><strong>M</strong> Alarm signal manual silence operates.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><strong>N</strong> Alarm signal silence visual indication operates.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><strong>O</strong> Alarm signal and visible signal devices, when silenced, automatically reinitialize upon subsequent alarm.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><strong>P</strong> Alarm signal silence automatic cut-out timer.</td>
<td>Time:</td>
<td></td>
</tr>
</tbody>
</table>
### Table (Continued)

|   | Audible visual alarm signals programmed and operate per design and specification. | Yes | No | N/A |
|---|--------------------------------------------------------------------------------|
| R | Input circuit, alarm and supervisory operation, including audible and visual indicator operates. | Yes | No | N/A |
| S | Input circuit supervision fault causes a trouble indication. | Yes | No | N/A |
| T | Output circuit alarm indicators operate. | Yes | No | N/A |
| U | Output circuit supervision fault causes a trouble indication. | Yes | No | N/A |
| V | Visual indicator test (lamp test) operates. | Yes | No | N/A |
| W | Coded signal sequences operate not less than the required number of times and the correct alarm signal operates thereafter. | Yes | No | N/A |
| X | Coded signal sequences are not interrupted by subsequent alarms. | Yes | No | N/A |
| Y | Ancillary device control circuit is rated for the intended purpose. | Yes | No | N/A |
| Z | Ancillary device by-pass results in trouble signal. | Yes | No | N/A |
| AA | Input circuit to output circuit operation, including ancillary device circuits for correct program operation, as per design and specification. | Yes | No | N/A |
| BB | Fire alarm system reset operates. | Yes | No | N/A |
| CC | Main power supply to emergency power supply transfer operates. | Yes | No | N/A |
| DD | Control unit or transponder bonded to ground. | Yes | No | N/A |
| EE | Status change confirmation feature (smoke detectors only) verified. | Yes | No | N/A |

### C5.2 VOICE COMMUNICATION TEST

(Reference: Clauses 4.2.4 and 5.2.3.1)

<table>
<thead>
<tr>
<th></th>
<th>Power 'ON' indicator operates.</th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Common visual trouble signal operates.</td>
<td>Yes</td>
<td>No</td>
<td>N/A</td>
</tr>
<tr>
<td>C</td>
<td>Common audible trouble signal operates.</td>
<td>Yes</td>
<td>No</td>
<td>N/A</td>
</tr>
<tr>
<td>D</td>
<td>Trouble signal silence switch operates.</td>
<td>Yes</td>
<td>No</td>
<td>N/A</td>
</tr>
<tr>
<td>E</td>
<td>All-call voice paging, including visual indicator, operates.</td>
<td>Yes</td>
<td>No</td>
<td>N/A</td>
</tr>
<tr>
<td>F</td>
<td>Output circuits for selective voice paging, including visual indication, operates.</td>
<td>Yes</td>
<td>No</td>
<td>N/A</td>
</tr>
<tr>
<td>G</td>
<td>Output circuits for selective voice paging trouble operation, including visual indication, operates.</td>
<td>Yes</td>
<td>No</td>
<td>N/A</td>
</tr>
<tr>
<td>H</td>
<td>Microphone, including press to talk switch, operates.</td>
<td>Yes</td>
<td>No</td>
<td>N/A</td>
</tr>
<tr>
<td>I</td>
<td>Operation of voice paging does not interfere with initial inhibit time of alert signal or alarm signal.</td>
<td>Yes</td>
<td>No</td>
<td>N/A</td>
</tr>
<tr>
<td>J</td>
<td>All-call voice paging operates (on emergency power supply).</td>
<td>Yes</td>
<td>No</td>
<td>N/A</td>
</tr>
<tr>
<td>K</td>
<td>Upon failure of one amplifier, system automatically transfers to backup amplifier(s).</td>
<td>Yes</td>
<td>No</td>
<td>N/A</td>
</tr>
<tr>
<td>L</td>
<td>Circuits for emergency telephone call-in operation, including audible and visual indication operates.</td>
<td>Yes</td>
<td>No</td>
<td>N/A</td>
</tr>
<tr>
<td>M</td>
<td>Circuits for emergency telephones for operation, including two-way voice communication, operates.</td>
<td>Yes</td>
<td>No</td>
<td>N/A</td>
</tr>
<tr>
<td>N</td>
<td>Circuits for emergency telephone trouble operation, including visual indication, operates.</td>
<td>Yes</td>
<td>No</td>
<td>N/A</td>
</tr>
<tr>
<td>O</td>
<td>Emergency telephones verbal communication operates.</td>
<td>Yes</td>
<td>No</td>
<td>N/A</td>
</tr>
<tr>
<td>P</td>
<td>Emergency telephones operable or in-use tone at handset operates.</td>
<td>Yes</td>
<td>No</td>
<td>N/A</td>
</tr>
<tr>
<td>Q</td>
<td>While in standby mode, voice communication busses used for paging, alert signal, alarm signal, and emergency telephone communication circuits, an open circuit fault, or short circuit fault, or operation of an overcurrent protective device provided for the purpose, shall result in a specific trouble indication specific to the faulty buss.</td>
<td>Yes</td>
<td>No</td>
<td>N/A</td>
</tr>
</tbody>
</table>
C5.3 REQUIRED SYSTEM RESPONSE TIMES
(Reference: Clause 5.2.4.1)

| A | Audible signal devices and visible signal devices operated within 10 s, and Subsequent input operated within 10 s. | Yes ☐ | No ☐ | – |
| B | Remote connection operated within 10 s. | Yes ☐ | No ☐ | N/A ☐ |
| C | Releasing device start of sequence operated within 10 s. | Yes ☐ | No ☐ | N/A ☐ |
| D | Required annunciation operated within 10 s, and Subsequent input operation within 10 s. | Yes ☐ | No ☐ | – |
| E | Required central alarm and control facility operated within 10 s, and Subsequent input operation within 10 s. | Yes ☐ | No ☐ | N/A ☐ |
| F | Ancillary Circuits operated within 10 s, and Subsequent input operation within 30 s. | Yes ☐ | No ☐ | N/A ☐ |

NOTE: Refer to Table 2 for required system response times.

C5.4 CONTROL UNIT OR TRANSPONDER INSPECTION
(Reference: Clause 4.2.4 and 5.2.5.1)

Control unit or transponder location:
Control unit or transponder identification:

| A | Input circuit designations correctly identified in relation to connected field devices. | Yes ☐ | No ☐ | N/A ☐ |
| B | Output circuit designations correctly identified in relation to connected field devices. | Yes ☐ | No ☐ | N/A ☐ |
| C | Correct designations for common control functions and indicators. | Yes ☐ | No ☐ | N/A ☐ |
| D | Plug-in components and modules securely in place. | Yes ☐ | No ☐ | N/A ☐ |
| E | Plug-in cables securely in place. | Yes ☐ | No ☐ | N/A ☐ |
| F | Record the date, revision and version of firmware and software program. | Date: | Rev: | Ver: |
| G | Control unit and transponder is clean and free of dust and dirt. | Yes ☐ | No ☐ | N/A ☐ |
| H | Fuses in accordance with manufacturer's specification. | Yes ☐ | No ☐ | N/A ☐ |
| I | Control unit or transponder lock functional. | Yes ☐ | No ☐ | N/A ☐ |
| J | Termination points from wiring to field devices secure. | Yes ☐ | No ☐ | N/A ☐ |
| K | Control unit or transponder power disconnects in accordance with CSA C22.1, Safety Standard for Electrical Installations, Canadian Electrical Code, Part I. | Yes ☐ | No ☐ | N/A ☐ |
| L | Field wiring entry points for the various circuits and circuit separations shall be in accordance with the manufacturer's installation instructions. | Yes ☐ | No ☐ | N/A ☐ |
| M | Main power supply feed wiring in accordance with manufacturer's specifications. | Yes ☐ | No ☐ | N/A ☐ |
| N | Verify control units or transponders with stand alone capability serves the same area for both input circuits and output circuits. | Yes ☐ | No ☐ | N/A ☐ |
| O | Control units or transponders which operate with stand alone capability have signal silence, reset, and trouble silence switches with visual indicators, degraded mode capability and stand alone capability indicators. | Yes ☐ | No ☐ | N/A ☐ |
| P | Each control unit or transponder furnished with operating and maintenance instructions, and installation instructions. | Yes ☐ | No ☐ | N/A ☐ |
| Q | Control unit or transponder visual indicators comply with Table 3, Visual Indicators-Colour Code. | Yes ☐ | No ☐ | N/A ☐ |
### C5.5 LARGE SCALE NETWORK SYSTEMS

(Reference: Clauses 4.2.4 and 5.3.2)

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Verify control units or transponders serve the same area for both input circuits and output circuits;</td>
<td>Yes</td>
<td>No</td>
<td>N/A</td>
</tr>
<tr>
<td>B</td>
<td>Verify control units or transponders with stand alone capability have signal silence, reset, and trouble silence switches with visual indicators, degraded mode capability and stand alone capability indicators.</td>
<td>Yes</td>
<td>No</td>
<td>N/A</td>
</tr>
<tr>
<td>C</td>
<td>Confirm that between any nodes a single open circuit fault, wire-to-wire short circuit fault, or ground fault on the network results in a trouble signal at each node and continued alarm receipt capability at each node under these conditions.</td>
<td>Yes</td>
<td>No</td>
<td>N/A</td>
</tr>
<tr>
<td>D</td>
<td>To test stand alone capability, create a condition of data communication link failure, and confirm each control unit or transponder is capable of receiving an alarm initiation and provides output operation in the area as served by the control unit or transponder.</td>
<td>Yes</td>
<td>No</td>
<td>N/A</td>
</tr>
</tbody>
</table>
| E | To test degraded mode capability, create a condition of data communication link failure in two separate locations creating two network segments, and confirm each segment of the network have the following operation:  
(i) Operate the alarm signals in accordance with the system operating sequence;  
(ii) Maintain synchronization of control units or transponders for alarm signals and alarm signals;  
(iii) Operate local relays in control units or transponders connected to ancillary devices; as required;  
(iv) Confirm the operation of acknowledge, signal silence, reset and trouble silence switches with visual indicators, degraded mode capability and stand alone capability indicators, are functional for each network segment. | Yes | No | N/A |

### C5.6 POWER SUPPLY INSPECTION

(Reference: Clauses 4.2.4, 5.4.1 and 5.4.2)

**Control unit or transponder location:**  
**Control unit or transponder identification:**
### C5.7 EMERGENCY POWER SUPPLY TEST AND INSPECTION

(Reference: Clauses 4.2.4, 5.4.4, 5.4.5, D3.1—A, D3.1—B and D3.1—C)

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Conforms with the requirements of CAN/ULC-S524, Standard for Installation of Fire Alarm Systems; and CSA C22.1, Safety Standard for Electrical Installations, Canadian Electrical Code, Part I, Section 32.</td>
<td>Yes ☐ No ☐ N/A ☐</td>
</tr>
<tr>
<td>B</td>
<td>Fused in accordance with the manufacturer's marked rating of the system.</td>
<td>Yes ☐ No ☐ N/A ☐</td>
</tr>
<tr>
<td>C</td>
<td>The primary supply is equipped with the identified disconnect means.</td>
<td>Yes ☐ No ☐ N/A ☐</td>
</tr>
<tr>
<td>D</td>
<td>Adequate to meet the requirements of the system.</td>
<td>Yes ☐ No ☐ N/A ☐</td>
</tr>
<tr>
<td>E</td>
<td>Power for ancillary devices is taken from a source separate from the fire alarm system control unit or transponder power supply.</td>
<td>Yes ☐ No ☐ N/A ☐</td>
</tr>
<tr>
<td>F</td>
<td>Power for ancillary devices is taken from the control unit or transponder that is designed to provide such power.</td>
<td>Yes ☐ No ☐ N/A ☐</td>
</tr>
<tr>
<td>G</td>
<td>Ancillary devices, which are powered from control unit or transponder, are recorded.</td>
<td>Yes ☐ No ☐ N/A ☐</td>
</tr>
</tbody>
</table>

#### Control unit or transponder location:

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Correct battery type as recommended by manufacturer.</td>
<td>Yes ☐ No ☐ N/A ☐</td>
</tr>
<tr>
<td>B</td>
<td>Correct battery rating as determined by battery calculations based on full system load.</td>
<td>Yes ☐ No ☐ N/A ☐</td>
</tr>
<tr>
<td>C</td>
<td>Battery voltage with <strong>main power supply</strong> 'on'.</td>
<td>Voltage: V dc Current: A dc</td>
</tr>
<tr>
<td>D</td>
<td>Battery voltage and current with <strong>main power supply</strong> 'off' and <strong>fire alarm system</strong> in supervisory condition.</td>
<td>Voltage: V dc Current: A dc</td>
</tr>
<tr>
<td>E</td>
<td>Battery voltage and current with <strong>main power supply</strong> 'off' and <strong>fire alarm system</strong> in full load alarm condition.</td>
<td>Voltage: V dc Current: A dc</td>
</tr>
<tr>
<td>F</td>
<td>Charging current on a fully charged battery.</td>
<td>A</td>
</tr>
<tr>
<td>G</td>
<td>Inspected for physical damage.</td>
<td>Yes ☐ No ☐ N/A ☐</td>
</tr>
<tr>
<td>H</td>
<td>Terminals cleaned and lubricated.</td>
<td>Yes ☐ No ☐ N/A ☐</td>
</tr>
<tr>
<td>I</td>
<td>Terminals clamped tightly.</td>
<td>Yes ☐ No ☐ N/A ☐</td>
</tr>
<tr>
<td>J</td>
<td>Correct electrolyte level.</td>
<td>Yes ☐ No ☐ N/A ☐</td>
</tr>
<tr>
<td>K</td>
<td>Specific gravity of the electrolyte is within manufacturer’s specifications.</td>
<td>Yes ☐ No ☐ N/A ☐</td>
</tr>
<tr>
<td>L</td>
<td>Electrolyte leakage.</td>
<td>Yes ☐ No ☐ N/A ☐</td>
</tr>
<tr>
<td>M</td>
<td>Adequately ventilated.</td>
<td>Yes ☐ No ☐ N/A ☐</td>
</tr>
<tr>
<td>N</td>
<td>Record manufacturer’s date code or in-service date.</td>
<td>Date:</td>
</tr>
<tr>
<td>O</td>
<td>Disconnection causes trouble signal.</td>
<td>Yes ☐ No ☐ N/A ☐</td>
</tr>
<tr>
<td>P</td>
<td>Indicate type of battery tests performed on a fully charged battery: (i) Required supervisory load for 24 h followed by the required full load operation; or (ii) A silent test by using the load resistor method may be used for the full duration test (Refer to Appendix D1, Silent Test); or (iii) Silent accelerated test. (Refer to Appendix D2, Silent Accelerated Test).</td>
<td>Yes ☐ No ☐</td>
</tr>
<tr>
<td>Q</td>
<td>Record calculated battery capacity. (Refer to Appendix D3.1-C).</td>
<td>Ah</td>
</tr>
<tr>
<td>R</td>
<td>Record battery terminal voltage after completion of tests.</td>
<td>V dc</td>
</tr>
<tr>
<td>S</td>
<td>Battery voltage not less than 85% of its rating after the tests.</td>
<td>Yes ☐ No ☐ N/A ☐</td>
</tr>
<tr>
<td>T</td>
<td>Generator provides power to the AC circuit serving the <strong>fire alarm system</strong>.</td>
<td>Yes ☐ No ☐ N/A ☐</td>
</tr>
<tr>
<td>U</td>
<td>Trouble condition at the emergency generator results in an audible common trouble signal and a visual indication at the required annunciator.</td>
<td>Yes ☐ No ☐ N/A ☐</td>
</tr>
</tbody>
</table>
### C5.8 ANNUNCIATOR, REMOTE TROUBLE SIGNAL UNIT AND DISPLAY AND CONTROL CENTRE TEST AND INSPECTION

(Reference: Clauses 4.2.5 and 5.5.1)

<table>
<thead>
<tr>
<th>Annunciation or remote trouble signal unit location:</th>
<th>Annunciation or remote trouble signal unit identification:</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Power 'on' indicator operates.</td>
<td>Yes ☐ No ☐ N/A ☐</td>
</tr>
<tr>
<td>B Individual alarm and supervisory input zone clearly indicated and separately designated.</td>
<td>Yes ☐ No ☐ N/A ☐</td>
</tr>
<tr>
<td>C Individual alarm and supervisory input zone designation labels are properly identified.</td>
<td>Yes ☐ No ☐ N/A ☐</td>
</tr>
<tr>
<td>D Where active and supporting field devices are utilized, device labels correspond with actual field location.</td>
<td>Yes ☐ No ☐ N/A ☐</td>
</tr>
<tr>
<td>E Common trouble signal operates.</td>
<td>Yes ☐ No ☐ N/A ☐</td>
</tr>
<tr>
<td>F Visual indicator test (lamp test) operates.</td>
<td>Yes ☐ No ☐ N/A ☐</td>
</tr>
<tr>
<td>G Input wiring from control unit or transponder is supervised and of the correct type and gauge in accordance with the equipment manufacturer’s installation wiring requirements.</td>
<td>Yes ☐ No ☐ N/A ☐</td>
</tr>
<tr>
<td>H Alarm signal silence visual indicator operates.</td>
<td>Yes ☐ No ☐ N/A ☐</td>
</tr>
<tr>
<td>I Switches for ancillary functions operate as per design and specification.</td>
<td>Yes ☐ No ☐ N/A ☐</td>
</tr>
<tr>
<td>J Ancillary functions visual indicators operate.</td>
<td>Yes ☐ No ☐ N/A ☐</td>
</tr>
<tr>
<td>K Manual activation of alarm signal and indication operates.</td>
<td>Yes ☐ No ☐ N/A ☐</td>
</tr>
<tr>
<td>L Displays are visible in installed location.</td>
<td>Yes ☐ No ☐ N/A ☐</td>
</tr>
<tr>
<td>M Operates on emergency power.</td>
<td>Yes ☐ No ☐ N/A ☐</td>
</tr>
<tr>
<td>N Visual indicators comply with Table 3, Visual Indicators-Colour Code.</td>
<td>Yes ☐ No ☐ N/A ☐</td>
</tr>
<tr>
<td>O Multi-line sequential display operates as per Appendix C5.9 (Annunciators or Sequential Displays), where utilized.</td>
<td>Yes ☐ No ☐ N/A ☐</td>
</tr>
</tbody>
</table>

### C5.9 ANNUNCIATORS OR SEQUENTIAL DISPLAYS

(Reference: Clauses 4.2.5, 5.5.2 and Appendix C5.8-O)

<table>
<thead>
<tr>
<th>Annunciator or sequential display location:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annunciator or sequential display identification:</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>A</td>
</tr>
<tr>
<td>B</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>C</td>
</tr>
<tr>
<td>D</td>
</tr>
<tr>
<td>E</td>
</tr>
<tr>
<td>F</td>
</tr>
<tr>
<td>G</td>
</tr>
<tr>
<td>H</td>
</tr>
<tr>
<td>I</td>
</tr>
<tr>
<td>J</td>
</tr>
<tr>
<td>K</td>
</tr>
<tr>
<td>L</td>
</tr>
</tbody>
</table>

**C5.10 REMOTE TROUBLE SIGNAL UNIT TEST AND INSPECTION**

(Reference: Clauses 4.2.5 and 5.5.3)

Remote trouble signal unit location:  
Remote trouble signal unit identification:  

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Input wiring from control unit or transponder is supervised.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Visual trouble signal operates.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Audible trouble signal operates.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>Audible trouble signal silence feature operates.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Compliance Requirements 9.36.5.

Question:
What is required by the AHJ to verify compliance with energy performance compliance 9.36.5.?
A checklist is a valuable tool to assist the AHJ in a plans review. The City of Edmonton, the City of Calgary and Alberta Municipal Affairs are currently working in harmony for the establishment of such a checklist. This checklist is anticipated to be complete by November 1, 2016.

Performance modeling, and the information required to be provided for permit applications can follow the information provided within Division C Subsection 2.2.8. This information should include details provided within the drawings and specifications, as well as a copy of the House Performance Compliance Calculation Report.

Expectations of the AHJ
Relevant detailed documentation from a designer for assessing the proposed design for Code compliance for 9.36:

- **Building Envelope.** Is the separation between the interior and the exterior environments of a building, comprising of its exterior walls, roof, foundation and slab-on-ground.
- **Lighting.** Includes interior and exterior lighting components and systems connected to the buildings electrical service.
- **HVAC.** Heating, ventilating and air-conditioning covers items such as ducting and piping, controls, ventilation and related equipment.
- **Service Water Heating.** Is concerned with systems used for the supply of water for purposes other than space heating.

Responsibilities of the designer: Compliance documentation.

Background Information:
2014 Alberta Building Code requirements
Division C Subsection 2.2.8.
2.2.8. Drawings, Specifications and Calculations for Energy Performance Compliance
2.2.8.1. Application
1) This Subsection applies only to houses with or without a secondary suite and to buildings containing only dwelling units and common spaces whose total floor area does not exceed 20% of the total floor area of the building that are modeled in accordance with Subsection 9.36.5. of Division B to demonstrate compliance with the energy efficiency objectives of Subsections 9.36.2. to 9.36.4. of Division B. (See Appendix A.) (See also Sentence 9.36.1.2.(1) of Division B and A-9.36.1.3.(3) in Appendix A of Division B.)

2.2.8.2. Information Required on Drawings and Specifications

1) Except as provided in Sentences (2), (3) and (4), the drawings and specifications for the proposed house shall include
   a) the effective thermal resistance values and respective areas of all opaque building envelope assemblies, including all above-ground and below-ground roof/ceiling, wall, and floor assemblies,
   b) the overall thermal transmittance (U-value), solar heat gain coefficient and respective areas of all fenestration and door components,
   c) the ratio of total vertical fenestration and door area to gross wall area,
   d) the performance rating, energy source, and types of all equipment required for space-heating and -cooling and service water heating,
   e) the design basis for the ventilation rates,
   f) where a test is used to determine the airtightness of a house, the measured airtightness of the building envelope in air changes per hour, and
   g) any additional features used in the energy model calculations that account for a significant difference in house energy performance.

2) The effective thermal resistance values and respective areas of opaque building envelope assemblies that cover less than 2% of the total area of their respective assembly type need not be provided in the drawings and specifications required in Sentence (1).

3) Where part-load characteristics are used in the modeling of the HVAC equipment, they need not be provided in the drawings and specifications required in Sentence (1).

4) The features of the proposed house that differ from those of the reference house shall be detailed in the specifications required in Sentence (1).

2.2.8.3. House Performance Compliance Calculation Report

1) A house performance compliance calculation report shall be provided in accordance with Sentence (2) for each proposed house design.

2) In addition to the drawings and specifications required in Article 2.2.8.2., the house performance compliance calculation report shall include
   a) a project information section containing
      i) the name or identifier of the project,
      ii) a description of the project,
      iii) the address of the project,
      iv) the name and version of the calculation tool,
      v) the geographic region in which the proposed house is to be built, and
      vi) the identifier for the climatic data set used for analysis,
   b) a summary of the characteristics of the building envelope, HVAC system and service water heating system reflecting the information provided in Article 2.2.8.2.,
   c) an energy performance data summary containing
i) the annual energy consumption of all energy sources calculated for the proposed house (see Appendix A), and
ii) the house energy target of all energy sources calculated for the reference house,
d) where a software program is used to determine compliance,
i) the name of the software program(s), and
ii) a list of any adaptations made by the user to the software relating to input or output values, and
e) a statement that the calculation was performed in compliance with Subsection 9.36.5.
of Division B. Compliance Paths:

**Performance.** The expected energy performance characteristics for the building are met using a design prepared by a qualified professional. This approach offers the greatest possible design flexibility while still meeting energy efficiency goals.

**Performance using Simple Trade-Off.** The expected energy performance characteristics for the various building elements are met, however, within in each building element, i.e. exterior fenestration, it is possible to 'trade-off' increased performance in one element for reduced performance in another (i.e. increase wall insulation to allow more less efficient windows). This can be done by the builder without needing to engage a professional designer.

**Prescriptive.** The expected energy performance characteristics for the various building elements are met by following the prescribed approach set out in the Code. For example, by following the prescribed level of thermal insulation and amount of windows for the region where the building is to be constructed.
Energy Efficiency Application

Question:
Buildings containing non-residential occupancies whose combined total floor area exceeds 300 sq meters or medium hazard industrial shall comply with NECB. 9.36.1.3.(4). ?

Correct. Buildings containing non-residential occupancies, whose total floor area exceeds 300 sq meters would be required to meet the 2011 National Energy Code of Canada for Buildings.

Examples:

1) Mercantile Occupancy
   Building Height: 2 storeys
   Building Area: 255 sq meters

   Which part of the Code (Part 3 or Part 9) would be applicable for the design of the construction of the building? Part 9
   Is Professional Involvement required? Yes, over 250 sq meters.
   Which Energy Code is applicable? 2011 NECB, total floor area is 510 sq meters.

2) Mercantile Occupancy
   Building Height: 2 storeys
   Building Area: 120 sq meters

   Which part of the Code (Part 3 or Part 9) would be applicable for the design of the construction of the building? Part 9
   Is Professional Involvement required? No, less than 250 sq. meters
   Which Energy Code is applicable? 2011 NECB or ABC 9.36

3) Medium Hazard Industrial Occupancy
   Building Height: 1 storeys
   Building Area: 100 sq meters

   Which part of the ABC (Part 3 or Part 9) would be applicable for the design of the construction of the building? Part 9, less than 600 sq meters and 3 storeys or less.
   Is Professional Involvement required? No, less than 500 sq. meters
   Which Energy Code is applicable? 2011 NECB
Background Information:

2014 Alberta Building Code requirements

9.36.1.3. Compliance and Application (See Appendix A.)

4) Buildings containing non-residential occupancies whose combined total floor area exceeds 300 m² or medium-hazard industrial occupancies shall comply with the NECB.

A-9.36.1.3. Compliance Options According to Building Type and Size. Table A-9.36.1.3. describes the types and sizes of Part 9 buildings to which Section 9.36. and the NECB apply.

<table>
<thead>
<tr>
<th>Building Types and Sizes</th>
<th>Energy Efficiency Compliance Options</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A9C 9.36.2. to 9.36.4. (Prescriptive)</td>
</tr>
<tr>
<td>• houses with or without a secondary suite</td>
<td>✓</td>
</tr>
<tr>
<td>• buildings containing only dwelling units with common spaces ≤ 20% of building's total floor area(1)</td>
<td>✓</td>
</tr>
<tr>
<td>• Group C occupancies</td>
<td>✓</td>
</tr>
<tr>
<td>• buildings containing Group D, E or F3 occupancies whose combined total floor area ≤ 300 m² (excluding parking garages that serve residential occupancies)</td>
<td>✓</td>
</tr>
<tr>
<td>• buildings with a mix of Group C and Group D, E or F3 occupancies where the non-residential portion's combined total floor area ≤ 300 m² (excluding parking garages that serve residential occupancies)</td>
<td>✓</td>
</tr>
<tr>
<td>• buildings containing Group D, E or F3 occupancies whose combined total floor area &gt; 300 m²</td>
<td>X</td>
</tr>
<tr>
<td>• buildings containing F2 occupancies of any size</td>
<td>X</td>
</tr>
</tbody>
</table>

Notes to Table A-9.36.1.3.:

(1) The walls that enclose a common space are excluded from the calculation of floor area of that common space.

Definitions

Floor area means the space on any storey of a building between exterior walls and required firewalls, including the space occupied by interior walls and partitions, but not including exits, vertical service spaces, and their enclosing assemblies.

Building area means the greatest horizontal area of a building above grade within the outside surface of exterior walls or within the outside surface of exterior walls and the centre line of firewalls.

2.4.2. Professional Involvement

2.4.2.1. General

3) Except as required in Sentence (9), registered architectural professional and registered engineering professional seals and stamps are not required on plans or specifications for a building.

d) 3 storeys or less in building height, classified as a business and personal services occupancy, mercantile occupancy or industrial occupancy that,

i) if 1 storey in building height, has a building area of 500 m² or less,

ii) if 2 storeys in building height, has a building area of 250 m² or less, or

iii) if 3 storeys in building height, has a building area of 165 m² or less,
Pull Stations and Lower Exits Update

Question?
Residential buildings more than 3 storeys in building height are being designed with the main floor suites having egress doors that lead directly to the street. These doors permit the occupants to not have to use the public corridor in the case of an emergency, and therefore have no access to a pull station. The wording of the 2014 ABC clause 3.2.4.17.(1)(b) requires that a pull station be installed in "every floor area near every exit". Would the exterior doors (ie. patio door) on the main floor suites require a pull station?

Further review and discussion on this question was brought forward to NRC. Interpretation provided by NRC determined that an exterior egress doorway such as a patio door installed in a suite of a building referenced under sentence 3.2.4.17.(1) would not meet the intent of the sentence, or the definition of an exit (required or not), and would not require the installation of a pull station at these locations.

Background Information:
3.2.4.17. Manual Stations
1) Except as permitted by Sentences (2) and (3), where a fire alarm system is installed, a manual station shall be installed in every floor area near
a) every principal entrance to the building, and
b) every exit.

2) In a building that is sprinklered throughout, a manual station is not required at an exterior egress doorway from a suite that does not lead to an interior shared means of egress in a hotel or motel not more than 3 storeys in building height, provided each suite is served by an exterior exit facility leading directly to ground level.

3) In a building that is sprinklered throughout, a manual station is not required at an exterior egress doorway from a dwelling unit that does not lead to an interior shared means of egress in a building not more than 3 storeys in building height containing only dwelling units, provided each dwelling unit is served by an exterior exit facility leading directly to ground level.

4) In a building referred to in Sentences (2) or (3), manual stations shall be installed near doorways leading from shared interior corridors to the exterior.

NRC Response
Your question:
This issue specifically deals with clause 3.2.4.16.(1)(b). This same wording appears in article 3.2.4.16. of the 2015 NBC. This requires that a pull station be installed in "every floor area near every exit". Prior to the 2005 NBC the requirement was for a pull station at each "required" exit. The term "required" is no longer in the NBC. The situation at hand where this is causing difficulty is when there are main floor suites of a multistory building that have access to exit.
doors in the interior to a corridor and also exterior doors to a patio or common area that leads to the street. The situation also occurs where a high rise building is built on a podium which includes townhouses that have access to an interior corridor as well as to a common area or patio that leads to the street. We have interpreted this article to require a pull station at the swinging door (sliding door would not count as exit door) that leads to the exterior patio or common area that leads to the street. We consider this door to be an exit that the occupants could use. Without a pull station at this door they could exit the building in a fire scenario without informing the remainder of the building of the hazard. We however, appear to be in a minority of municipalities that are enforcing this requirement in this way. We are also receiving a lot of kickback from the industry. We would appreciate if you could confirm or correct our interpretation of this article. We will endeavor to convey the confirmation or correction of the interpretation to other AHJs in the province and elsewhere when received.

**Codes Canada response:**

The requirements for manual stations were revised in the 1995 edition of the National Building Code. Two proposed changes (OCC 145 and 228) on this issue were submitted for the 1993 public consultation. Following the consultation, the Standing Committee on Occupancy (SCO) decided to withdraw OCC 228 and to address comments on OCC 145. OCC 145, was developed by a group on sprinkler systems. The reason behind the change was:

As part of the proposal to increase the number of buildings in which sprinklers would be installed, it is proposed to require rudimentary fire alarm systems in a number of small residential buildings. These changes will permit the installation of a fire alarm system without having to install pull stations in residential buildings at the doors from suites that lead directly to the outdoors. However, pull stations would be required at the exits from interior corridors.

Further clarification of the intent of the Code that it should not be possible to leave the building by a normal exit without passing a manual pull station is also provided. Even though the principal entrance may not have been designed as an exit facility, many of the building occupants will be most familiar with this as the usual egress route and will tend to use it in an emergency.

Sentences 3.2.4.16.(2) and (3) were introduced for Group C buildings that would not have been required to have a fire alarm system if they were not sprinklered (see Sentences 3.2.4.1.(5) and (6) of the NBC 2015), and where "each suite has direct access to an exterior exit facility leading to ground level."

In addition, one of the comments raised by the public, which is related to your question, received the following response from the SC-O that clarifies the intent of Clause 3.2.4.16.(1)(b).

Regarding a comment questioning permission not to exempt patio doors for high buildings, it was noted that these are not normally designated as exits.

Therefore, Clause 3.2.4.16.(1)(b) was not intended to apply to patio doors that are not designated as exits. As an aside, a door designated as an exit, must comply with many code provisions, such as:

- Article 3.4.1.8. on transparent doors,
- Article 3.4.5.1. on exit signs,
- Article 3.4.6.11. on door threshold and obstruction of doors by hangings or draperies,
- Article 3.4.6.12. on door swing, and
- Article 3.4.6.16. on door release hardware.
Energy Efficiency

Question?
Can 2x4 walls be used for an attached garage under the 9.36 requirements?
The construction of the garage walls could implement 2x4 walls as long as the RSI value required for the garage can still be achieved.

A heated or non-heated attached garage for a single family dwelling (including one with a secondary suite) under 9.36.2.1.(6) specifies that the building envelope assembly which separates this heated or unheated garage space from unconditioned space or the exterior air must be provided with the requirements within 9.36.2. which includes the minimum RSI overall thermal resistance values.

Therefore, all of the walls forming part of an attached garage, whether it is heated or not, are required to provide a minimum RSI meeting the Tables provided in 9.36.

Background Information:
2014 Alberta Building Code
9.36.2. Building Envelope
9.36.2.1. Scope and Application
1) Except as provided in Sentences (2) and (6) to (8), this Subsection is concerned with the loss of energy due to heat transfer and air leakage through materials, components and assemblies, including their interfaces, forming part of the building envelope where it separates conditioned space from unconditioned space, the exterior air or the ground.

2) The requirements of this Subsection also apply to components of a building envelope assembly that separate a conditioned space from an adjoining storage garage, even if the storage garage is intended to be heated. (See Appendix A and A-9.36.1.3.(5) in Appendix A.)

8) The requirements of this Subsection also apply to components of a building envelope assembly that separate a heated or unheated attached garage from unconditioned space or the exterior air, where the attached garage serves
a) not more than one dwelling unit, or
b) a house with a secondary suite.

A-9.36.1.3.(5) Exemptions. Examples of buildings and spaces that are exempted from the requirements of Section 9.36. include seasonally heated buildings, storage and parking garages, small service buildings or service rooms and unconditioned spaces in buildings. However, note that, where a building envelope assembly of an exempted building is adjacent to a conditioned space, this assembly must meet the requirements of Section 9.36.

A-9.36.2.1.(2) Wall or Floor between a Garage and a Conditioned Space. A wall or a floor between a conditioned space and an adjoining storage garage must be airtight and insulated because, even if the garage is equipped with space-heating equipment, it may in fact be kept unheated most of the time.
School Washrooms

Question?
Proposals have been made for schools to provide gender neutral washroom facilities. How should washrooms be labelled in a school and how are the calculations done to ensure the required number of facilities have been provided?

The provisions in the Alberta Building Code 2014 that address water closet (toilet) numbers for each sex are based on the wording of the National Building Code 2010.
The Alberta Building Code requires that water closets are to be provided for each sex. The Appendix note to this Sentence, however, better clarifies the intent: “It is deemed that rooms each containing a single water closet available for both males and females would satisfy the intent of the Code. The total number of water closets must be adequate for the total number of occupants.”

So while the wording of Sentence 3.7.2.2.(1) suggests that dedicated washroom facilities exclusive to each sex are required, the Appendix note qualifies that a gender-neutral washroom (washroom available for both females/males) containing a single water closet would satisfy the intent of the requirement as well.
Where a room containing a single water closet (such as a gender-neutral washroom) is provided, a lockable, full-height door is required. This requirement for the design of the room as stated, is an Alberta-specific requirement not contained within the National Building Code.
For Example: An establishment could therefore install individual gender-neutral universal toilet rooms in lieu of sex-specific washroom facilities as long as the total number of required washrooms based on the total occupant load is still provided.
Additionally, washroom areas containing multiple water closets constructed with individual stalls meeting Sentence (17) with full height doors capable of being locked from the inside and full height walls to ensure unwanted visual surveillance was mitigated would also be acceptable.

Background Information:
2014 Alberta Building Code requirements
3.7.2.2. Water Closets
1) Except as permitted by Sentence (4), water closets shall be provided for each sex assuming that the occupant load is equally divided between males and females, unless the proportion of each sex expected in the building can be determined with reasonable accuracy. (See Appendix A.)

A-3.7.2.2.(1) Water Closets. Sentence 3.7.2.2.(1) assumes that there will be a sufficient number of persons in the building to justify the provision of separate water closet facilities for both males and females. In some circumstances overall low occupant loads would not require more than one water closet for males and one water closet for females and yet the building has
more than one storey. It is deemed that rooms each containing a single water closet available for both males and females would satisfy the intent of the Code. The total number of water closets must be adequate for the total number of occupants. Requirements for barrier free accessibility also need to be considered. If the entrance storey is accessible and the upper storeys are not required to be accessible, a room in the accessible storey must meet the requirements of Section 3.8. and can serve both males and females. If provided, a non-accessible room, designed to serve both males and females, in each non-accessible upper storey would be acceptable. Sentence 3.7.2.2.(4) permits a single water closet to serve both males and females if the total occupant load is low.

17) If a room contains
a) not more than 1 water closet, the doorway to the room shall be provided with a full-height door that is capable of being locked from the inside, or
b) no fewer than 2 water closets or at least 1 water closet and 1 urinal, the room shall be designed so that water closets, urinals and lavatories are not visible from the entrance to the room.

3.2.1.1. Functional Statements
F130 To limit unwanted visual surveillance.