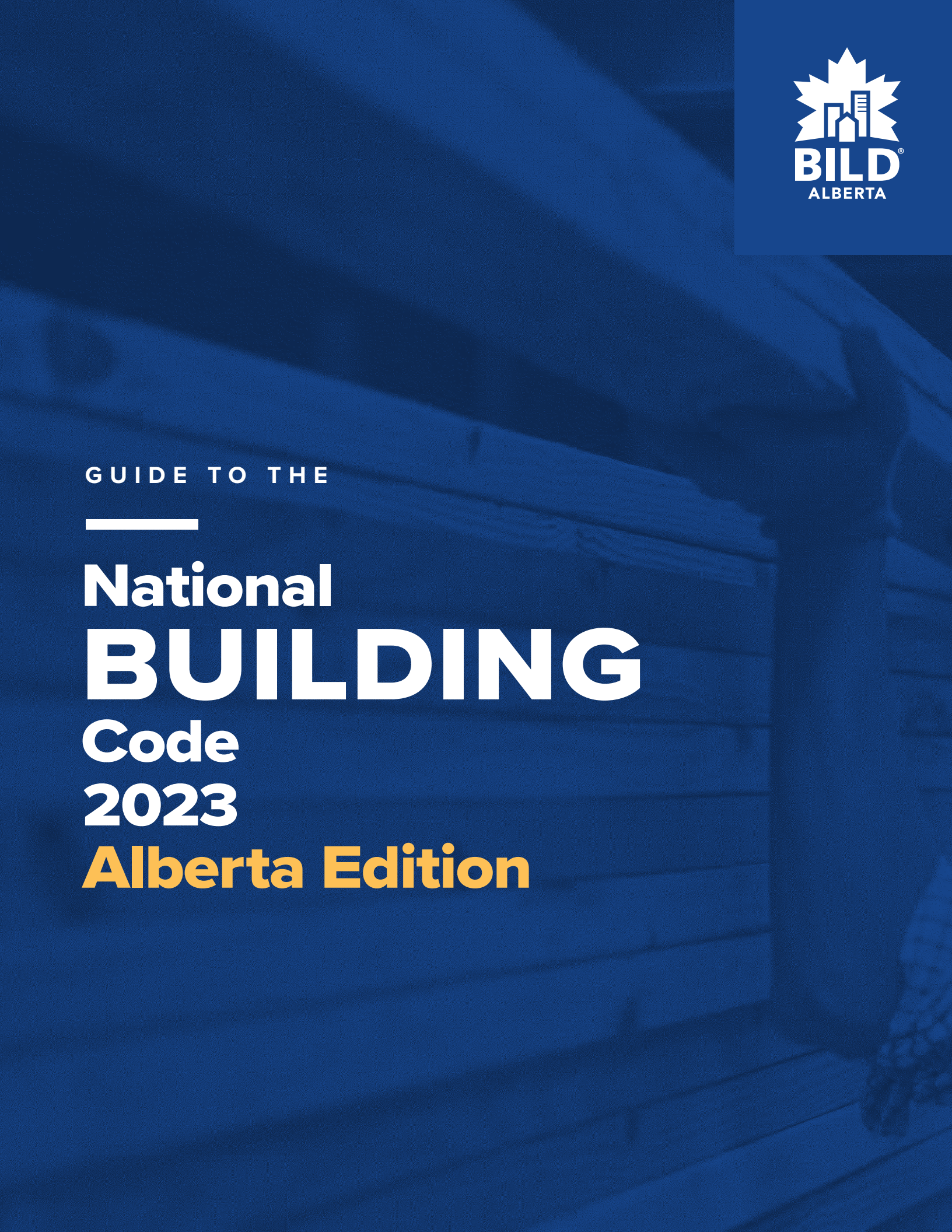


BILD ALBERTA

GUIDE TO THE

National BUILDING Code 2023 Alberta Edition

Overview

BILD Alberta's Guide to the National Building Code – 2023 Alberta Edition provides an outline of the requirements of the National Building Code 2023 – Alberta Edition (NBC(AE) 2023). The guide will provide an overview of the code changes between the NBC(AE) 2019 and the NBC(AE) 2023, including the introduction of tiered energy performance compliance. The intent of this guide is to be a resource to help industry members comply with the code requirements, and to be an education tool for all those participating in the residential construction industry.

The information provided in this guide is from the National Building Code - 2023 Alberta Edition, and the Government of Alberta STANDATAs.

Project Funding

This code guide was developed thanks to the financial support of Natural Resources Canada.

Disclaimer

While this guide provides valuable information, it does not encompass all the requirements for compliance with the NBC(AE) 2023 or the National Building Code of Canada 2020 (NBC 2020). For complete and official regulations, direct referral to the NBC(AE) 2023 and NBC 2020 is required.

This guide emphasizes construction and compliance for residential buildings in Alberta. It primarily references Part 9 (Housing and Small Buildings) and Part 3 (Fire Protection, Occupant Safety and Accessibility) of the NBC(AE) 2023. While this guide may be helpful outside Alberta, remember that the NBC(AE) 2023 incorporates provincial variations compared to the National Building Code of Canada 2020.

About BILD Alberta

The Building Industry and Land Development Association Alberta (BILD Alberta) advocates on behalf of members on provincial matters that impact Residential Construction and Land Development. BILD Alberta represents developers, builders, renovators, trades, consultants, manufacturers, service professionals and suppliers. To learn more about BILD Alberta and the work we do, please go to our website.

Contents

This guide was last updated December 2024.

Attachment of Vinyl Cladding

9.27.12.

Vinyl Siding, Insulated Vinyl Siding and Vinyl Soffits

This new Subsection outlines specific requirements and standards related to the use of vinyl siding, insulated vinyl siding, and vinyl soffits in building construction and will direct the attachment requirements to Subsection 9.27.5.

9.27.5.

Attachment of Cladding

This Subsection presents requirements for the attachment of various cladding types with the new addition of requirements for vinyl siding.

Horizontally applied vinyl claddings must be fastened to framing or furring members, or to blocking between framing members. However, there are exemptions that allow vertically applied vinyl siding and vertically applied insulated vinyl siding to be attached to sheathing only. This can only be achieved with a minimum of 14.3 mm (9/16 in.) lumber, 12.5 mm (1/2 in.) plywood or waferboard, or 11 mm (7/16 in.) OSB.

If using flat wall insulating concrete form units (ICF), then cladding, trim, and furring members can be fastened to the web fastening strips if using screws that conform to the requirements described in Article 9.27.5.4.(2). Attachment to ICF units is only applicable where the 1-in-50 wind pressure (HWP) is less than or equal to 0.60 kPa. These requirements are set within Table 9.27.5.4.-A Attachment of Cladding to Wood Framing, Furring Members or Blocking.

It is important to note that for horizontally applied vinyl and insulated vinyl siding the maximum spacing for nails or staples is 400 mm (16 in.) o.c. This can adjust the stud spacing of an exterior wall assembly as the nails or staples must penetrate the framing members. A greater spacing can be permitted only if an evaluation report prepared by an accredited certification organization can be provided as described in footnote 2 of Table 9.27.5.4.-A. The Standards Council of Canada (SCC) provides a list of accredited testing and calibration laboratories.

Horizontally applied vinyl and insulated vinyl claddings must penetrate through the nail-holding base or minimum 32 mm (1 1/4 in.) into the framing member. The minimum 38 mm (1 1/2 in.) fastener can penetrate the framing member with a wood sheathing and accommodate the gap required for expansion and contraction of the vinyl cladding. A longer fastener will be required if a different sheathing product is used such a gypsum sheathing.

Penetrations by Outlet Boxes or Service Equipment in Concealed Spaces

9.10.9.8.

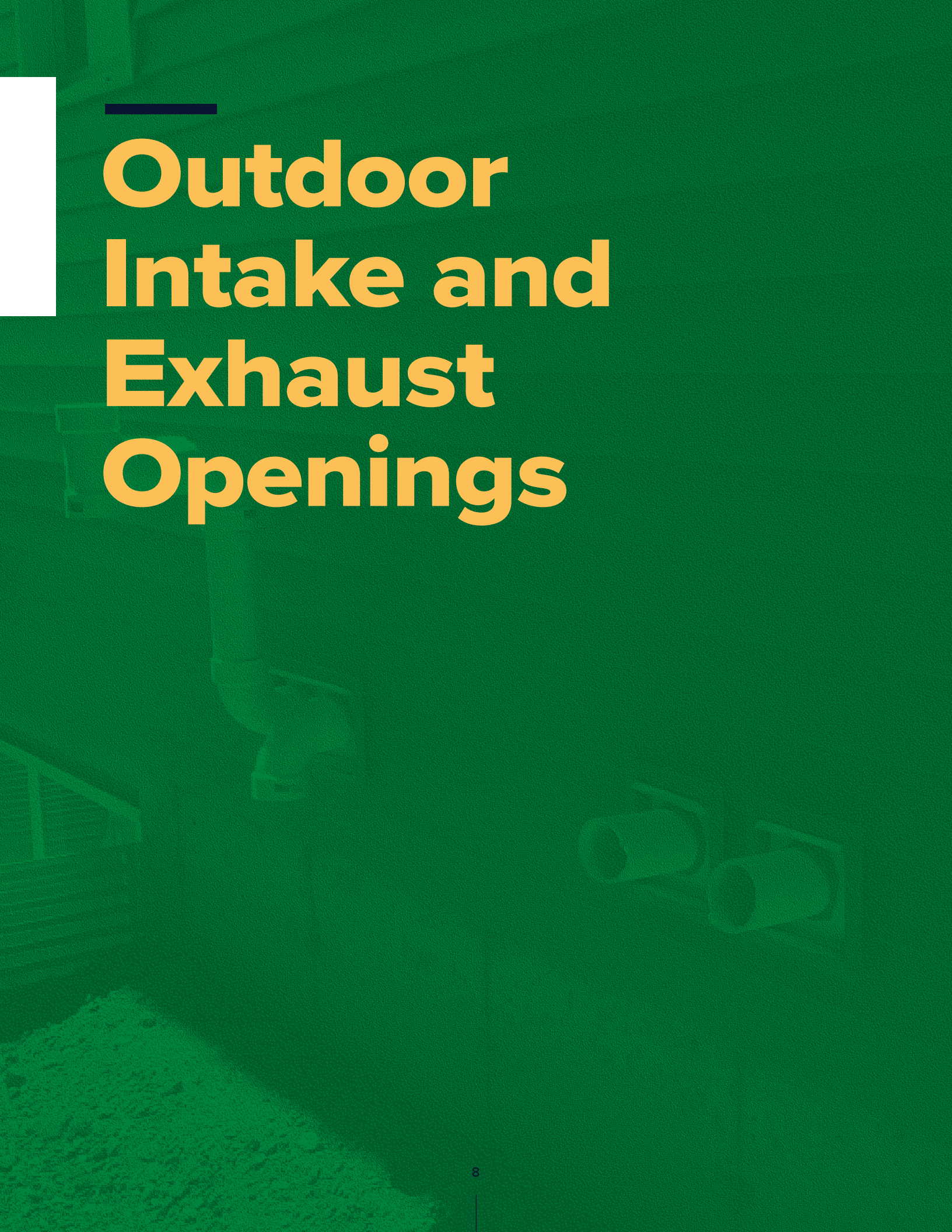
Penetrations by Outlet Boxes or Service Equipment in Concealed Spaces

This is a new Article that clarifies the requirements for the protection of penetrations by outlet boxes or service equipment in assemblies with a require fire-resistance rating and expands protection options to include industry practices. Test methods are also referenced to increase compliance options while reducing the potential for confusion.

Noncombustible outlet boxes are not required to be subjected to testing if a single unit is less than 0.016 m^2 (25 in^2) in area (the size of a 3-gang outlet box), do not have an aggregate area of 0.065 m^2 (100 in^2) within any 9.3 m^2 (100 ft^2) of surface area, and the space between a membrane and the outlet box is less than 3 mm (1/8 in.). When noncombustible outlet boxes are installed on opposite sides of a vertical fire separation, they must be separated by a minimum of 600 mm (24 in.) horizontally, use an enclosure, or the cavity be filled with a rock or slag fiber insulation with the sides and back of the outlet box being encapsulated by the noncombustible insulation.

Combustible outlet boxes are not required to be subjected to testing if they are separated from the cavity with an enclosure that does not exceed 0.3 m^2 (465 in^2), that is made from a fire block material, or located in a space where the cavity is filled with a rock or slag fiber insulation with the sides and back of the outlet box being encapsulated by the noncombustible insulation. Examples of this are an enclosure constructed of gypsum, a moldable putty pack, etc. Confirming compatibility of products is important (e.g. moldable putty packs can only be used with specific combustible outlet boxes). Within the enclosure, the outlet box must be less than 0.016 m^2 (25 in^2) in area (the size of a 3-gang outlet box).

Outdoor Intake and Exhaust Openings



9.32.3.13.

Outdoor Intake and Exhaust Openings

This Article describes requirements for location, design, and installation of outdoor intake and exhaust openings.

INTAKE OPENINGS

Location of intake openings must be designed to avoid contaminants and exhausts with moisture such as automobile exhausts, bathroom ventilation, and cloth dryer exhaust. These must maintain a clearance no less than 900 mm (36 in.) horizontally, 1800 mm (71 in.) vertically above exhaust openings and 900 mm (36 in.) vertically below exhaust openings that are potential sources of contaminants for an individual dwelling unit or house with a secondary suite. These requirements are specific to Alberta as outlined in STANDATA variance 23-BCV-008(REV1). The NBC 2020 requires a clearance of 1800 mm (71 in.) both horizontally and vertically.

Intake openings must be clearly labeled for identification from locations outside of the dwelling unit and the bottom must be located a minimum of 450 mm (18 in.) from the ground or lower permanent horizontal surface, or the depth of expected snow accumulation, whichever is greater. Corrosion-resistant screens or grilles that are easily removable without special tools to prevent the entry of animals and insects must be installed. Suitable protection must be provided for intake openings in exposed locations to prevent the entry of precipitation such as louvres, weather cowls, or other means.

EXHAUST OPENINGS

Location of exhaust openings must maintain a clearance of no less than 900 mm (36 in.) horizontally, 900 mm (36 in.) vertically above and 1800 mm (71 in.) vertically below intake openings for an individual dwelling unit or house with a secondary suite. These requirements are specific to Alberta as outlined in STANDATA variance 23-BCV-008(REV1). The NBC 2020 requires a clearance of 1800 mm (71 in.) both horizontally and vertically. Should an exhaust opening be located within a soffit, the soffit must be unvented or blocked for a minimum of 1800 mm (71 in.) on each side. If the opening is in a side wall within 1800 mm (71 in.) from a soffit that is vented, refer to Table 9.32.3.13.-A to determine a required width of unvented or blocked soffit centered over the outlet.

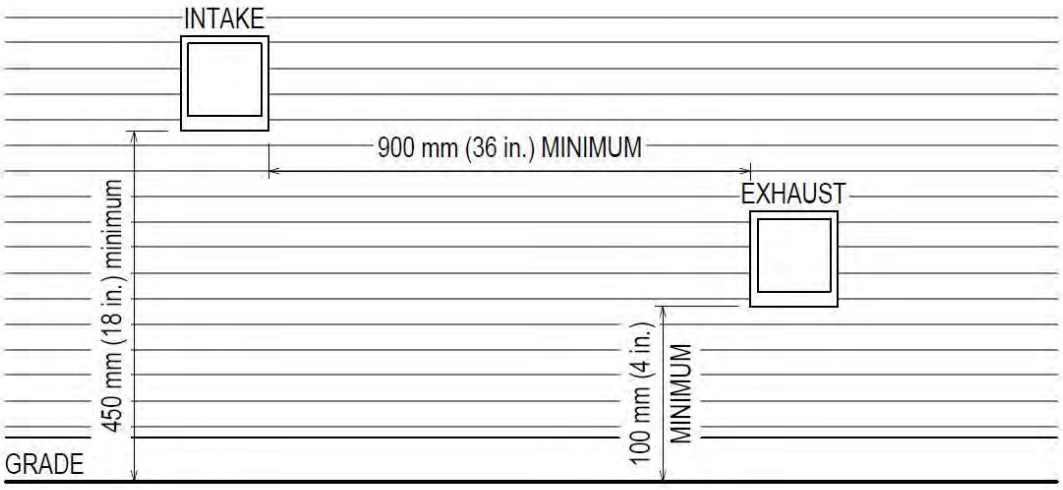
The bottom of an exhaust opening must be located a minimum of 100 mm (4 in.) from the ground or lower permanent horizontal surface. Except for heat recovery ventilators, a backdraft damper must be incorporated. For exhaust openings with no backdraft damper, a corrosion-resistant screen or grille that is easily removable without special tools to prevent the entry of animals and insects must be installed. Suitable protection must be provided for exhaust openings in exposed locations to prevent the entry of precipitation such as louvres, weather cowls, or other means.

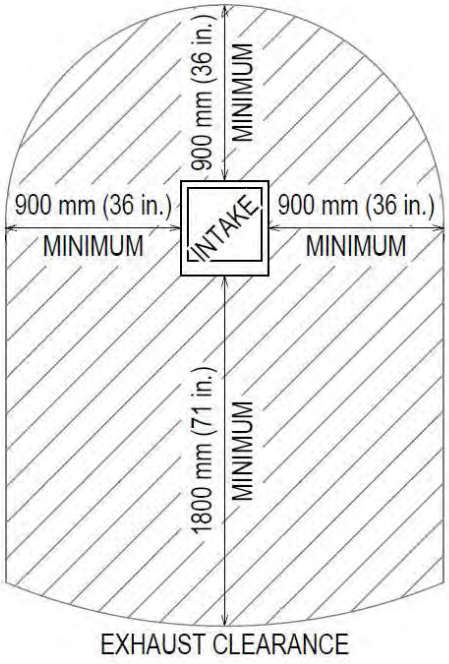
Figure 1 provides a visual outline for the intake and exhaust opening recommendations.[1]

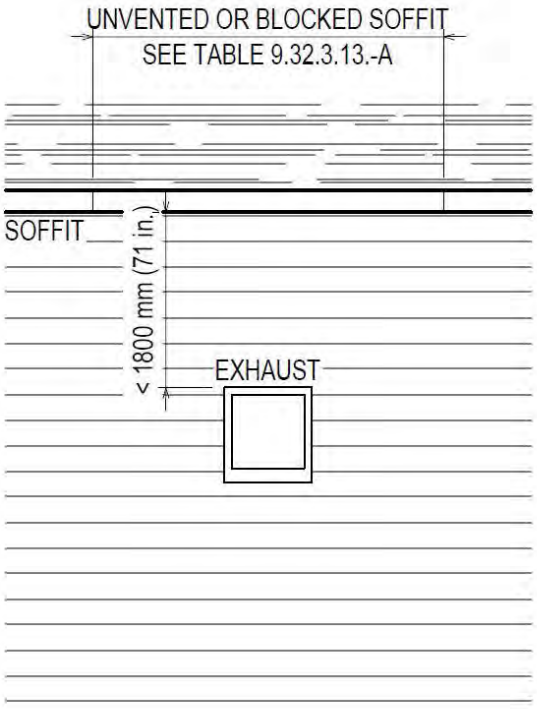
1 Alberta Municipal Affairs. “STANDATA variance 23-BCV-008(REV1): Residential exhaust outlet clearance from air intakes” 17 Oct. 2024. https://open.alberta.ca/dataset/08ac69ae-5639-46a3-83d2-c52246c78621/resource/3b792769-bcb0-4acf-a315-cefdbedac893/download/ma-standata-variance-building-23-bcv-008-rev1-2024-10.pdf.

FIGURE 1

Recommendations for intake and exhaust openings







Manufactured Windows, Doors and Skylights

9.7.6.1.

Installation of Windows, Doors and Skylights

This Article references a Harmonized Standard to be followed for the installation of windows, doors and skylights and applies to both manufactured and site-built fenestration components.

The interface between any fenestration component and the building envelope is a potential location for air and water ingress and must be installed correctly to ensure the integrity of the building envelope for this first plane of protection. While there have been no changes to the code language, there have been changes to the Harmonized Standard. Code users must refer to CSA A440.4 for installation requirements. Critical changes to this Harmonized Standard include new material requirements for shims, geographical locations where sub sill drainage is required for windows, requirements for sub sill drainage under all doors unless protected from precipitation, locations of sealant around window and door flanges with approved types, and specific locations of fasteners from the corners of flanges.

Required Guards

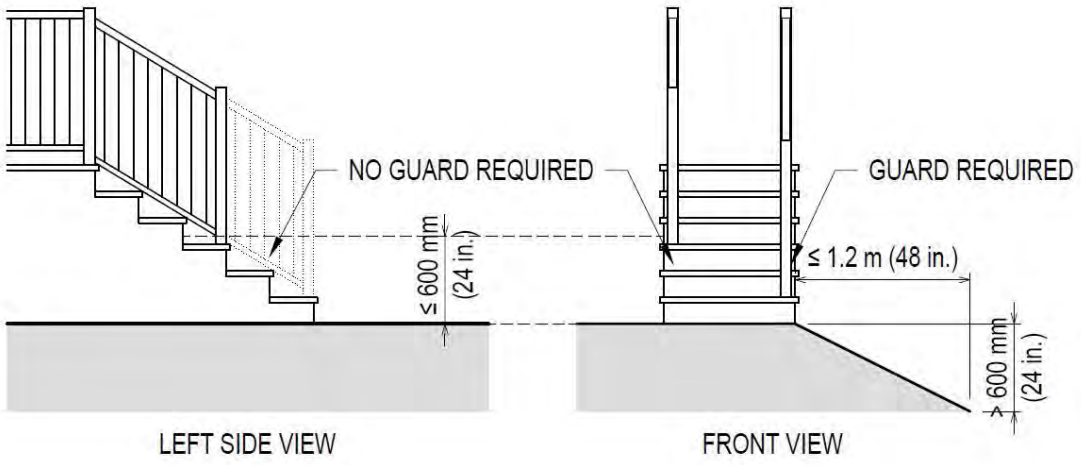
9.8.8.1.

Required Guards

This Article covers many specific situations where guards are required. Generally, guards are required where a walking surface has a difference in elevation of more than 600 mm (24 in.) from an adjacent surface to prevent people from falling. This edition of the code has introduced a new part of this requirement where the elevation of the walking surface will now be compared to the adjacent surface within 1.2 m (4 ft.) as shown in Figure 2.

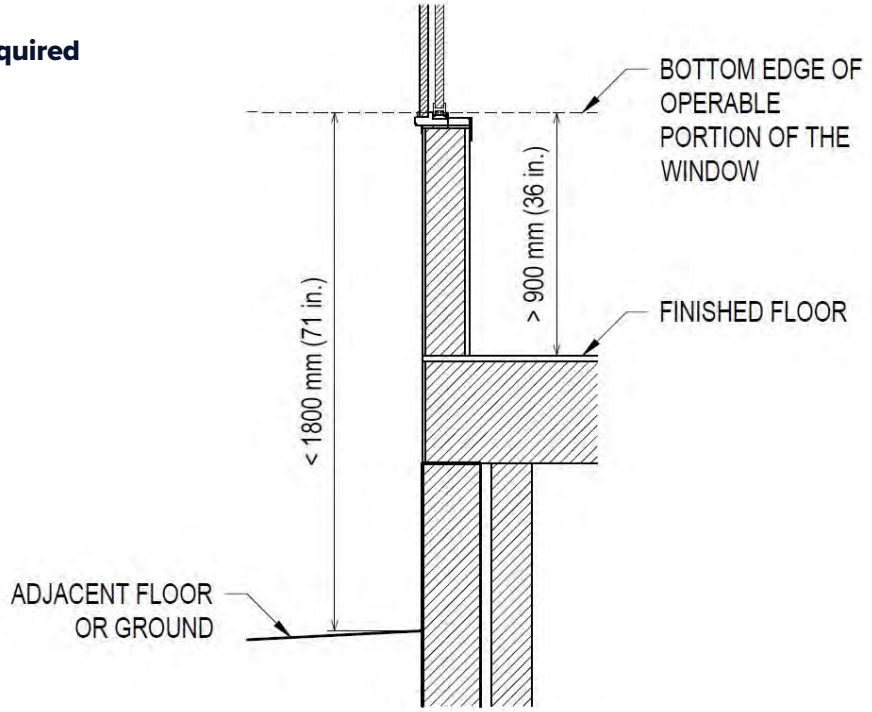
FIGURE 2

Guards for exterior walking surfaces



Also introduced in this edition are new requirements for windows. If the bottom edge of the operable portion of the window is greater than 900 mm (36 in.) above the finished floor, or less than 1800 mm (71 in.) above the floor or ground on the other side of the window then no protection will be required as shown in Figure 3. If the openable portion of a window cannot meet this requirement, a guard or mechanism that can only be released with the use of tools or special knowledge must be installed to limit any clear unobstructed opening to a maximum of 100 mm (4 in.).

FIGURE 3
No guard required



For all Part 9 buildings of residential occupancy a WOCD (window opening control device) mechanism that complies with ASTMF2090 “Standard Specification for Window Fall Prevention Devices with Emergency Escape (Egress) Release Mechanisms” will be compliant with egress windows described in Article 9.9.10.1.(1) Egress Windows or Doors for Bedrooms, and all windows described in 9.8.8.1.(4) Required Guards, but will not be permitted for use in adaptable or barrier-free dwelling units. This requirement is specific to Alberta as outlined in STANDATA variance 23-BCV-001. The NBC 2020 does not recognize the use of WOCDs in an egress required application for any building of residential occupancy.

Fire-Resistance and Fire-Protection Ratings

Table 9.10.3.1.-A

Fire and Sound Resistance of Walls

AND

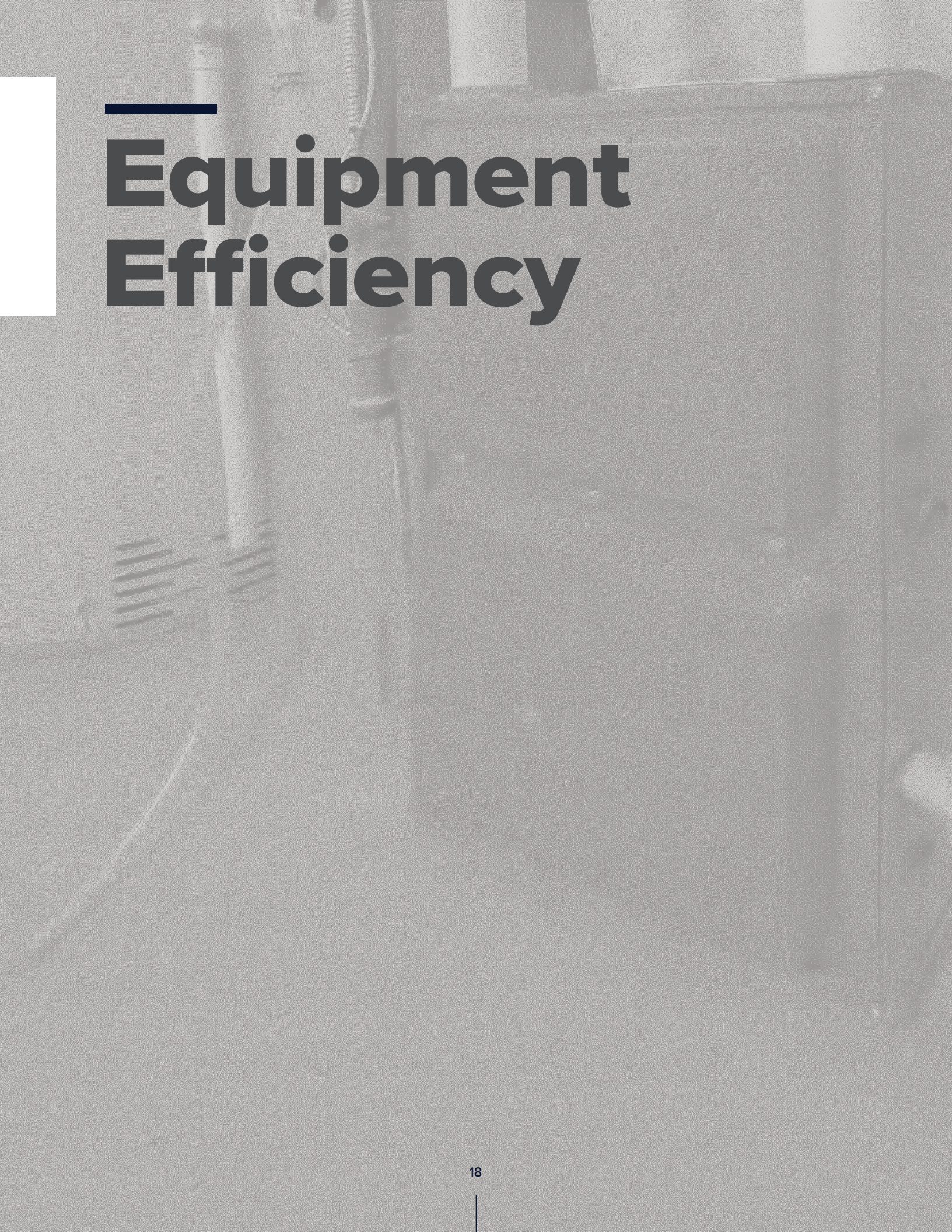
Table 9.10.3.1.-B

Fire and Sound Resistance of Floors, Ceilings and Roofs

These tables provide a list of assemblies with determined fire-resistance ratings (FRR) and typical sound transmission class (STC). FRR and STC ratings were established through a combination of direct testing and extrapolation from similar assemblies for the listed assemblies. Some assemblies have adjusted ratings from the previous edition of the NBC(AE), but the most impactful changes have been within the notes to the tables.

Of great importance is the addition of Note 16 for Table 9.10.3.1.-A. This note now requires backing with lumber of the same dimensions as the framing members to be installed at all joint locations of gypsum board on the interior side of exterior wall assemblies with a maximum spacing of 1524 mm o.c. (60 in.). When using listed assemblies, ensure all required notes are reviewed accurately when designing and constructing the wall, floor, ceiling or roof.

Equipment Efficiency



9.36.3.10.

Equipment Efficiency (HVAC Equipment)

This Article provides a detailed overview of minimum performance requirements for heating and cooling equipment typically installed in residential homes and small buildings. In this edition of the code some equipment performance requirements have changed. For example, a gas-fired warm-air furnace now requires a minimum performance requirement of 95% from the previous 92%. All forced air systems, both electric and gas-fired, will also be required to have equipped a high-efficiency constant torque or constant airflow fan motor. Combined space- and water-heating systems (combos) now require a minimum performance requirement of TPF = 0.80 from the previous TPF = 0.65.

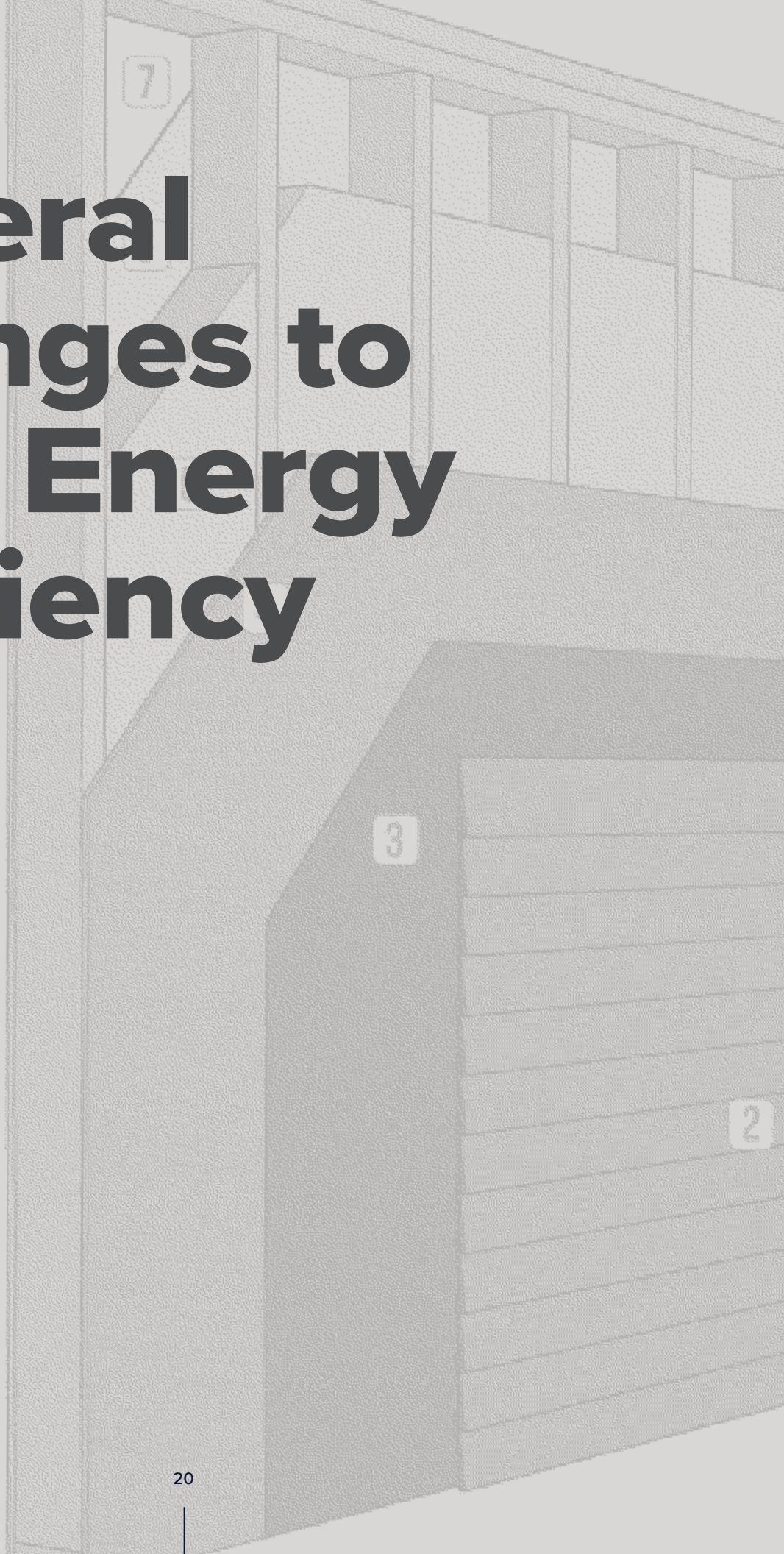
9.36.4.2.

Equipment Efficiency (Service Water Heating Equipment)

This Article provides a detailed overview of minimum performance requirements for service water heating equipment typically installed in residential homes and small buildings. In this edition of the code some equipment performance requirements have changed. For example, gas-fired tankless service water heaters have slightly increased minimum performance requirements, especially for larger (≥ 58.56kW [199,000 BTU]) systems.

Builders who have opted for the performance-based approach to energy efficiency compliance should consult with their Energy Advisors to fully understand how these new performance requirements will affect their building's performance.

General Changes to 9.36 Energy Efficiency



The NBC(AE) 2023 Part 9 energy efficiency provisions address the construction of the building envelope, the sizing and selection of HVAC and service water heating equipment, and the energy performance compliance for housing. Significant revisions have been identified from the NBC(AE) 2019 and some of the most notable changes are detailed below.

If prescriptively built to code, a building has an estimated equivalency of 2.5 air changes per hour (ACH) at 50 Pa pressure differential and testing is not required.

The effect of airtightness on performance modeling where testing is not conducted has been neutralized. The NBC(AE) 2019 applied a slight penalty when testing was not conducted and the 9.25.3. air barrier details were used resulting in an energy penalty of 1.2 ACH compared to the reference house. The NBC(AE) 2023 has no penalty for not testing and neutralizes energy loss calculated due to air leakage between the proposed house and the reference house.

9.36.5.10.

Modeling Building Envelope of Proposed House

Modeling of the proposed house now uses a maximum of 2.5 ACH at 50 Pa pressure differential where the air barrier system has been designed to Subsection 9.25.3. and Articles 9.36.2.9. and 9.36.2.10. which improved performance for the reference house for single family detached homes. This differs from the NBC 2020 which maintains the previous 3.2 ACH at 50 Pa where the air barrier system has been designed with Section 9.25.

9.36.5.14.

Modeling Building Envelope of Reference House

Modeling of the reference house now uses an airtightness of 3.0 ACH at 50 Pa pressure differential for semi-detached homes at any attached zones (party walls) when using the unguarded method and 2.5 ACH otherwise.

9.36.6.

Airtightness of Building Envelope

This is a new Subsection that adds substantial clarity around the use and targets for airtightness in all compliance paths of Section 9.36. Sentence 2 provides clarity for the use of CAN/CGSB-149.10 using parameters such as as-operated (no sealing of vents or ductwork) and allows both guarded and unguarded testing as applicable. Compliance with tables in this Subsection can be determined using values of ACH50, NLA10, or NLR50, however, a single-point test is not permitted for determining NLA10. Allowance of guarded testing will provide improved airtightness for builders not using sealed party wall approaches to multi-family building.

ACH50

ACH represents air changes per hour. This metric is used to quantify the rate at which the entire volume of air in a space is replaced with fresh air within one hour. This is calculated by dividing the volumetric flow rate of air into or out of a space by the volume of the space. A higher ACH indicates a more rapid rate of air turnover, which can be important for maintaining good indoor air quality and ventilation. A more airtight building will have a lower ACH as less air can leak in or out. Air leakage through penetrations such as cracks, doors and windows, poorly sealed electrical boxes and mechanical ducts, etc. can increase ACH. The subscript 50 represents a pressure differential of 50 pascals between the inside and outside of the building. This is the equivalent of an approximately 33 km/hr wind.

NLA10

NLA represents normalized leakage area. This metric is the equivalent area of a single, uniformly sized hole through which the same amount of air would leak under the same pressure difference as the actual building's leaks. NLA is calculated by dividing the total equivalent leakage area (ELA) by the total surface area of the building envelope and allows for a standardized comparison of airtightness between different buildings, regardless of their size or shape. A lower NLA value indicates a more airtight building, which can lead to improved energy efficiency, reduced heating and cooling costs, and better indoor air quality.

NLR50

NLR represents normalized leakage rate. This metric is the rate at which air leaks into or out of a building under specific pressure conditions. NLR is calculated by dividing the total leakage rate (TLR) by the total surface area of the building envelope and allows for a standardized comparison of airtightness between different buildings, regardless of their size or shape. A lower NLR value indicates a more airtight building, which can lead to improve energy efficiency, reduced heating and cooling costs, and better indoor air quality.

9.36.6.4.

Determination of Airtightness Level

The following terms shall have the following meanings:

- "zone" means a conditioned space or part thereof having a sufficiently large opening, such as an attic hatch, onto the location where the airtightness testing equipment is installed to provide enough airflow such that the entire one is at the same pressure.[2]
- "attached zone" means a zone whose boundary area is fully or partially in contact with an adjacent zone or zones. Attached zones may or may not be contained within the same building or dwelling unit.[2]

When using the guarded method for testing, airtightness levels will be dependent on the number of single or *attached zones* of the building and can be found in Table 9.36.6.4.-A. For example, a single detached home would be a single zone and require an ACH_{50} of 2.5. For the end unit of a rowhouse this would be considered two *attached zones* and require an ACH_{50} of 2.0.

When using the unguarded method for testing, airtightness levels will be dependent on the number of single or *attached zones* of the building and can be found in Table 9.36.6.4.-B, provided the zone is tested independently. For example, an end unit of a rowhouse would be considered two attached zones and require an ACH_{50} of 2.5. An interior unit of a rowhouse would be considered three *attached zones* and require an ACH_{50} of 2.0.

2 Alberta Municipal Affairs. "The National Building Code: 2023 Alberta Edition." National Research Council of Canada, 23 Jan. 2024, https://nrc-publications.canada.ca/eng/view/ft/?id=0316d953-0d55-4311-af69-cad55efec499.

Tiered Energy Performance Compliance

The NBC(AE) 2023 introduces a five-tiered energy performance compliance system for new residential buildings in Alberta (9.36.7. Tiered Energy Performance Compliance: Performance Path and 9.36.8. Tiered Energy Performance Compliance: Prescriptive Path). This system is designed to promote energy efficiency through multiple tiers. Compliance can be achieved through either a prescriptive path, which involves meeting specific requirements for building components and systems, or a performance path, which requires demonstrating a certain level of energy performance. The tiered system offers flexibility to builders and developers, allowing them to choose the tier that best suits their project and budget.

As of the publication of this guide, Tier 1 is the minimum province-wide standard as outlined in STANDATA bulletin 23-BCB-001. It is recommended to subscribe to the Government of Alberta's Building STANDATA to receive STANDATA email notifications from Alberta Municipal Affairs for knowledge when a higher tier is adopted as the minimum province-wide standard. Compliance with Subsections 9.36.7. and 9.36.8. is not mandatory as Tier 1 is deemed to meet the requirements of compliance with the prescriptive or trade-off requirements in Subsections 9.36.2. to 9.36.4. and the performance requirements in Subsection 9.36.5. This is specific to Alberta; the NBC 2020 requires both prescriptive and performance requirements of Tier 1 to be adhered to. The higher tiers provide guidelines for building owners who wish to design their buildings to a higher energy performance level than Tier 1. While Tiers 2 – 5 are optional, they are not enforceable under the *Safety Codes Act*. Only a currently adopted tier as the minimum province-wide standard is enforceable.

Energy performance tiers have increasing performance requirements as they progress as demonstrated in the table below. The building envelope improvement and the percent energy improvement are determined through energy modeling of the proposed house and reference house. The proposed house must show improvement from the reference house for the building envelope and the percent energy improvement. The percentages shown are calculated by subtracting the annual energy consumption of the proposed house from the house energy target of the reference house and dividing the result by the house energy target of the reference house.

TIER	PERFORMANCE COMPLIANCE (1)		PRESCRIPTIVE COMPLIANCE
	BUILDING ENVELOPE IMPROVEMENT	PERCENT ENERGY IMPROVEMENT	ENERGY CONSERVATION POINTS
1	0%	0%	-
2	≥ 5%	≥ 10%	10
3	≥ 10%	≥ 20%	Reserved
4	≥ 20%	≥ 40%	Reserved
5	≥ 40%	≥ 70%	Reserved

(1) Energy performance metrics for performance compliance are based on the total volume of conditioned space within the building or house greater than 300 m3 and where volume is not determined. This information and further information for total volume less than or equal to 300 m3 can be found in Table 9.36.7.2. Energy Performance Tiers for Buildings and Houses.

Tiered Energy Performance Compliance: **Prescriptive Path**

Prescriptive path compliance follows specific construction methods and materials. These tiers provide a progressive framework for achieving higher levels of energy efficiency. The specific requirements for each tier may vary depending on the building type, location, and other factors.

TIER 1: BASELINE ENERGY EFFICIENCY

- No energy performance improvement requirements.
- No energy conservation points required.

TIER 2: IMPROVED ENERGY EFFICIENCY

- Minimum energy conservation points required – 10
- Energy conservation measures can be found in Articles 9.36.8.5. to 9.36.8.11.

TIER 3: SUBSTANTIAL ENERGY EFFICIENCY

- Requirements for this tier have not yet been published.
- Minimum energy conservation points required - Reserved

TIER 4: HIGH ENERGY EFFICIENCY

- Requirements for this tier have not yet been published.
- Minimum energy conservation points required - Reserved

TIER 5: EXCEPTIONAL ENERGY EFFICIENCY

- Requirements for this tier have not yet been published.
- Minimum energy conservation points required - Reserved

Tiered Energy Performance Compliance: **Performance Path**

Performance path compliance allows for tailored solutions to meet the specific needs of a building project. This utilizes energy modeling to demonstrate compliance with specified energy performance targets. These tiers provide a progressive framework for achieving higher levels of energy efficiency. The specific requirements for each tier may vary depending on the building type, location, and other factors.

GENERAL REQUIREMENTS FOR ALL TIERS

- If required, peak cooling load for the proposed house cannot be greater than the reference house
- Other than Tier 1, if space heating is provided by a heat pump in the proposed house, the reference house must be modeled using the same equipment type as the secondary or back-up system in the proposed house, or electric resistance heaters where the proposed house provides no back-up system.
- If cooling systems are not installed in the proposed house, additional models must be completed for both the proposed and reference house using space-cooling serving all conditioned spaces to determine the peak cooling load.

TIER 1: BASELINE ENERGY EFFICIENCY

- No envelope or energy performance improvement requirements.
- No peak cooling load requirements.

TIER 2: IMPROVED ENERGY EFFICIENCY

- Requires a 10% energy performance improvement to the reference house for buildings or homes with a conditioned space air volume of > 300m^3 and where volume is not determined.
- Requires a 0% energy performance improvement to the reference house for buildings or homes with a conditioned space air volume of ≤ 300m^3.

TIER 3: SUBSTANTIAL ENERGY EFFICIENCY

- Requires a 20% energy performance improvement to the reference house for buildings or homes with a conditioned space air volume of > 300m^3 and where volume is not determined.
- Requires a 10% energy performance improvement to the reference house for buildings or homes with a conditioned space air volume of ≤ 300m^3.

TIER 4: HIGH ENERGY EFFICIENCY

- Will likely need continuous external insulation.
- Requires a 40% energy performance improvement to the reference house for buildings or homes with a conditioned space air volume of > 300m^3 and where volume is not determined.
- Requires a 30% energy performance improvement to the reference house for buildings or homes with a conditioned space air volume of ≤ 300m^3.

TIER 5: EXCEPTIONAL ENERGY EFFICIENCY

- Will likely need continuous external insulation.
- Requires a 70% energy performance improvement to the reference house for buildings or homes with a conditioned space air volume of > 300m^3 and where volume is not determined.
- Requires a 60% energy performance improvement to the reference house for buildings or homes with a conditioned space air volume of ≤ 300m^3.

BILD ALBERTA

Inquires and questions can be directed to

education@bildalberta.ca