Municipal Affairs

NBC 2015
(for AB edition)
& related code requirements in
NFC 2015
NPC 2015
and
NECB 2015

Significant Technical Changes

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Alberta Municipal Affairs
Discussion overview

- **Introduction (Type of changes, Editorial changes, loops)**
- **Changes in the NBC 2015 AB – Part 9 Housing and small buildings**
  - Examples of Alberta Specifics for part 9
  - Stairs (spiral, mixed threads, ornamental guards)
  - Lateral loads (seismic)
  - Low permeance materials
  - Low-exposure doors – main entrance door
  - Snow loads
  - Corridor maximum length
  - 9.36 energy efficiency
  - Protection near cooktops – microwave
  - Airborne sound transmission
  - Roofing, dampproofing and waterproofing - standards
  - Exterior insulation and finish systems (EIFS)
  - New Residential Fire Warning Systems (ULC-S 540)

- **Changes in the NBC 2015 AB – Part 3**
  - Examples of Alberta Specifics for part 3
  - Minimum Fire Rating of Cables in Air Plenums
  - Penetration by Electrical and Non-Electrical Outlet Boxes
  - Self-Service Storage Buildings
  - Protection of Foamed Plastics
  - Combustible Components for Exterior Walls
  - Installation of Smoke Dampers
  - Leakage-rated door assembly
  - Mezzanines and Openings through Floor Assemblies
  - Dance hall/Bar main entrance capacity.
  - Handrails for Aisles with Steps
  - Emergency crossover access to floor areas
  - Distance between exterior discharges of exits
  - Ornamental guards/guards height/ open risers
  - Accessibly
Discussion overview

- **Changes in the NBC 2015 AB –Part 5**
  - Curtain Walls, Window Walls, Storefronts and Glazed Architectural Structures
  - Exterior Insulation and Finishing System (EIFS)
  - Wind Uplift Resistance of Membrane Roofing Assemblies
  - Vegetated Roofing Systems
  - Sound Transmission

- **Changes in the NBC 2015–Part 6**
  - Drain Pans
  - Separation Distances of Exhausts and Outdoor Air Intakes

- **Changes in the NFC 2015**
  - Self-Service Storage Buildings
  - Other Changes

- **Changes in NPC 2015**
  - Water-use Efficiency: Supply Fittings and Shower Heads
  - Water-use Efficiency: Plumbing Fixtures

- **Changes in NECB 2015**
  - No more detailed trade off
  - New thermal requirements for semi-heated buildings
  - A performance level for air barrier assemblies of opaque building assemblies
  - Updated max (LPD)
  - Updated piping and duct insulation requirements
  - Heat Rejection
  - New prescriptive requirements for gas-fired outdoor packaged units
  - Updated performance requirements in the mechanical and service water tables
  - Reduced hot water discharge rate for showers and lavatories
  - Demand control ventilation

- **Changes in NECB 2017**
  - Efficiency improvement %
  - Building Envelope
  - Lighting
  - HVAC
Types of changes in Building Codes:

- **Modification:** Change/Update/Relocation/Relaxation
- **Addition:** New requirements
- **Deletion:** Replace/Delete

**Note:**
This presentation is preliminary.
Alberta specifics are not included unless stated.
Some of the following may not be adopted.
Editorial Changes

- Appendix / Notes/Attributes - After Each Part
- All parts except 9 & Appendix C & D/ Volume 1
- Part 9 / Volume 2
Editorial Changes

- Reorganization of Section 3.8/ Regrouped into 3 Subsections: Scope, Application & Design
- Reorganization of Part 6/ Grouped by major mechanical elements (Sections instead of Subsections / General provision at the front followed by System Specific
- Relocation of Fire & Sound Resistance Tables/ End of Part 9

Part 6
Section 6.1. General
Section 6.2. Planning
Section 6.3. Ventilation Systems
Section 6.4. Heating Systems
Section 6.5. Thermal Insulation Systems
Section 6.6. Refrigeration and Cooling Systems
Section 6.7. Piping Systems
Section 6.8. Equipment Access
Section 6.9. Fire Safety Systems
Challenges/Changes/loops

Some of the Challenges when adopting Alberta Specific Building code:
- Cross reference conflicts as a result of renumbering/deletion/addition.
- Avoiding loops.

E.g. Conflicts between Alberta specifics and NBC requirements.

Residential Occupancies - Sprinkler system.
1) Except as permitted in Sentences (2), (3) and (5) to (7), and Sentence 3.2.4.2.(4), a fire alarm system shall be installed in buildings in which an automatic sprinkler system is installed.
2) Except as permitted by Sentences (5) to (7) and Sentence 3.2.4.2.(4), a fire alarm system shall be installed in a building that is not sprinklered throughout and that contains

A residential occupancy with sleeping accommodation for more than 10 persons

A fire alarm system is not required in a hotel or motel 3 storeys or less in building height provided each suite has direct access to an exterior exit facility leading to ground level.
Changes in the NBC 2015 AB – Part 9 Housing and small buildings
Alberta Specific – Part 9

Example of Alberta specifics that might be retained/added:

- **Secondary Suites** (Area: no maximum or percentage limit)
- Non-openable/Openable window between attached garage and dwelling
- **Rooms containing welding** (3.3.1.25.)
- **HIRF**
- **Respond time for Fire department** (capable of beginning suppression).
- Deletion of 9.10.21. (camps) refer to Part 10
- **Anchorage of building 2 (2x4) sill plates, blocking @1.2 m O.C.**
- Insulation values for energy exempted, heated detached garage, etc.
- **Chimney and Gas vents Insulation & shield clearance**
- **Pine Shakes CSA O118.3**
- **Gypsum board ASTM C 840 standard in addition to CSA A82.31M**
- **Ventilation rough-in (fan) for future development**
- **Keeping HRAI Digest as good practice**
Stairs - Run width

9.8.4.2. Dimensions for Rectangular Treads (Private stairs)

<table>
<thead>
<tr>
<th></th>
<th>NBC 2010/ABC 2014</th>
<th>NBC 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RUN (Min.)</strong></td>
<td>210 mm (8 1/4 in.)</td>
<td>255 mm (10 in.)</td>
</tr>
<tr>
<td><strong>RISE (Max.)</strong></td>
<td>200 mm (7 7/8 in.)</td>
<td>200 mm (7 7/8 in.)</td>
</tr>
</tbody>
</table>
**Stairs-Spiral stairs**

9.8.4.7. Spiral Stairs

- **Detailed and Clarified (New to NBC)**
- **Not limited to dwelling unit anymore.**
- **Now! Permitted use as a the only means of egress when:**
  - Serves not more than 3 persons.
  - **Not** serve as an exit.

One bedroom = 2 persons, so the spiral stairs could serve a master-bedroom with an En-suite and a small study / reading room.
Stairs - Mixed Treads

9.8.4.5. Uniformity of Runs in Flights with Mixed Treads within Dwelling Units

- ABC 2014 did not allow mixed treads between floor levels
- **Now!** flexibility to mix in dwelling units
- Both tapered and rectangular
- In both directions

Changes indicate that stairs should not travel from larger treads (run) to narrower ones, in the descending motion, as this could lead to misstep and falls in stairs

**Result:** More design options available.
Stairs - Ornamental guards

9.8.8.6. Design of Guards to Not Facilitate Climbing

- **Part 9**: Permitted when protecting a level not more than **4.2 m** above adjacent level, **if more** design as per 9.8.8.6.(140-900mm)
- Opening through guards shall still be of a size that prevents the passage of a spherical object having a diameter of **100 mm** or **3 7/8 inch** or less.
Stairs-clarifications

9.8.7.5. Ergonomic Design

❖ Clearance and Design.

1) The clearance between a handrail and the surface behind it shall be not less than
   a) 50 mm, or
   b) where said surface is rough or abrasive, 60 mm.

2) All handrails shall be constructed so as to be continually graspable along their entire length with no obstruction on or above them to break a handhold. (See Note A-9.8.7.5.(2).)

Notes A-9.8.7.5.(2) Handrail Sections:

The graspable portion of a handrail should allow a person to comfortably and firmly grab hold by allowing their fingers and thumb to curl under part or all of the handrail.

Deleted appendix note that illustrate Handrail Sections.
Structural design—Lateral loads (Seismic)


High and Extreme (doesn’t apply to moderate or low forces)

Enhanced lateral resistance

- **Thicker sheathing**
- **Perpendicular blocking between wall studs**
- **Nailing of splices in wall top plates**
- **Anchor bolts**
- **Reduced spacing**

Seismic and Snow Loads have increased

Low:
- Sa ≤ 0.7, HWP < 0.8

High:
- Sa > 0.7, HWP < 1.2

HWP - Pincher Creek: 0.96

Extreme:
- Sa > 1.8, HWP > 1.2
Low permeance materials
9.25.5. Properties and Position of Materials in the Building Envelope

Requirements ABC 2014

- Water vapour permeance
  \[ < 60 \text{ ng/(Pa}\cdot\text{s}\cdot\text{m}^2) \]

- Air leakage characteristics
  \[ < 0.1 \text{ L/(s}\cdot\text{m}^2) @ 75 \text{ Pa} \]

- Requirements

Compliance with Article/Table 9.25.5.2.
(Position of Materials in the Building Envelope)
### Low permeance materials

#### 9.25.5. Properties and Position of Materials in the Building Envelope

<table>
<thead>
<tr>
<th>Material</th>
<th>Air leakage characteristic (L/(s•m²) @ 75 Pa)</th>
<th>Water vapour permeance (ng/(Pa•s•m²))</th>
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</thead>
<tbody>
<tr>
<td>Polyurethane spray foam—low density</td>
<td>0.1</td>
<td>300</td>
</tr>
<tr>
<td>Expanded (EPS) polystyrene Type II</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>Polyurethane spray foam—medium density</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Extruded (XPS) polystyrene Type I</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Foil-faced polyisocyanurate (XPS) polystyrene Type I</td>
<td>0</td>
<td></td>
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</tbody>
</table>

#### Table 9.25.5.2
Low permeance materials

9.25.5. Properties and Position of Materials in the Building Envelope

Water vapour permeance for panel-type materials (ng/(Pa•s•m²))

<table>
<thead>
<tr>
<th>Water Vapour Permeance (ng/(Pa•s•m²))</th>
<th>Revised Exempt</th>
<th>Table 9.25.5.2</th>
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</thead>
<tbody>
<tr>
<td>300</td>
<td></td>
<td></td>
</tr>
<tr>
<td>60</td>
<td>Revised Exempt</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Table 9.25.5.2</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

With water vapour permeance of 30 – 60 ng
Minimum R4 insulation value
In locations with HDD ≤ 6000

Air leakage characteristic for panel-type materials (L/(s•m²) @ 75 Pa)
Main entrance doors

Performance of Doors: Limited Water Ingress Control
A-9.7.4.2.(1) Standards Referenced for Windows, Doors and Skylights.

- Added Note (Appendix note) to clarify the requirements.
- Exterior doors must control air infiltration and precipitation ingress and conform to the Harmonized NAFS Standard and the Canadian Supplement.
- This change relaxes the requirements for main entrance doors that are protected from precipitation (i.e. located inside buildings), and clarifies the requirements for air infiltration and resistance to forced entry.
- Side-hinged doors protected from precipitation can comply with a referenced standard when tested with no pressure difference across the door. These are identified with a “Limited Water” (LW) rating on the label.
Snow loads

Appendix C- Climatic and Seismic Information for Building Design in Canada

- Snow load values remained unchanged in most locations (shown in grey),
- Decreased in 39 locations (in green), and
- Increased in 72 locations (in red).

Snow loads

Red = higher loading
Corridor length

9.9.7.3. Dead-End Corridors

1) Except for a dead-end corridor that is entirely within a suite and except as permitted in Sentence 9.9.9.2.(1), a dead-end corridor is permitted provided it is not more than 6 m long.

Previously Alberta specific 3 m long.

Harmonizing with NBC 2015
Section 9.36. Energy Efficiency

9.36.2.2. Determination of Thermal Characteristics of Materials, Components and Assemblies

4) The effective thermal resistance of opaque building assemblies shall be determined from

a) calculations conforming to Article 9.36.2.4., or

b) laboratory tests performed in accordance with ASTM C 1363, “Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus,” using an indoor air temperature of $21\pm1^\circ C$ and an outdoor air temperature of $-18\pm1^\circ C$ ($-35\pm1^\circ C$).

5) The thermal characteristics of log walls shall be determined by calculation in accordance with Section 305 of ICC 400, “Design and Construction of Log Structures.”

Existed in 2010 — carried over in NBC 2015
May not be adopted in Alberta.
Section 9.36. Energy Efficiency

9.36.2.9. Airtightness

1) The leakage of air into and out of conditioned spaces shall be controlled by constructing
   a) 9.36.2.9. (2-6) / 9.36.2.10. / 9.25.3. OR
   b) 9.36.2.9. (2-6) / Tested assembly to ULC-S742 / 9.25.3. OR
   c) 9.36.2.9. (2-6) / Tested assembly to ASTM E 2357 / 9.25.3.

NEW (conditions for using option c)
   i) the building will not be subjected to sustained wind loads calculated based on a 1-in-50 hourly
      wind pressure that exceed 0.65 kPa, and
   ii) the air barrier assembly is installed on the warm side of the thermal insulation of the opaque
      building assembly.

To Prevent: Physical degradation / Structure movement.

Edmonton 0.45 / Calgary 0.48 / Red Deer 0.40/ Lethbridge 0.66 / GB 0.43/Fort McMurray 0.35
Rocky Mountain 0.36 / Fort MacLeod 0.68/ HR 0.65/ Pincher Creek 0.96 / Turner Valley 0.65 /
Taber 0.63 / Cardston 0.72 /
Section 9.36. Energy Efficiency

9.36.2.1. Scope and Application

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.

Move this requirements to 9.25.

Keep 9.35.4.1 (Interior Finish)

The correct intent for insulation is to limit the probability of:

Deterioration, which could lead to compromised integrity of assemblies acting as environmental separators.
Microwave ovens and range hoods
A-9.10.22. Clearances from Gas, Propane and Electric Cooktops

- This change **exempts microwave** ovens and range hoods from the clearances specified in Article 9.10.22.2.
- **(CEC c22.2 #150)** This standard includes tests to confirm that the appliance will not present a hazard when installed according to the manufacturer’s instructions
- **Asbestos is not permitted for Protection anymore.**
Airborne sound transmission—Direct vs. flanking

9.11.1.2. Determination of Sound Transmission Ratings

- **Flanking transmission**
  - The sound passes around, over the top or under the primary partition (wall, roof, floor) separating two spaces.
  - Bothersome in multi-family residential buildings.

- **Dwelling units**
  - **47 ATSC** or
  - **50 STC** + prescriptive requirements for adjoining construction.

ASTC can also be calculated through Part 5 (simple/detailed method (NRC Guide)) and soundPATHS – A web application.

Dwelling unit and refuse/elevator

- **55 STC**
Roofing, waterproofing and dampproofing

Section 9.13. Dampproofing, Waterproofing and Soil Gas Control

- **CGSB material standards**
  - Deleted outdated standards
  - Replaced with ASTM where acceptable
  - Kept CGSB standards where no replacements are available

- **CGSB installation standards**
  - Delete and replace with prescriptive requirements.

9.13.2.3. Standards for Application
1) The method of application of all bituminous dampproofing materials shall conform to
a) CAN/CGSB-37.3-M, “Application of Emulsified Asphalts for Dampproofing or Waterproofing,”
b) CGSB-37-GP-12Ma, “Application of Unfilled Cutback Asphalt for Dampproofing,” or
c) CAN/CGSB-37.22-M, “Application of Unfilled, Cutback Tar Foundation Coating for Dampproofing.”
Exterior Insulation and Finish Systems (EIFS)

9.27.13. Exterior Insulation Finish Systems

- Reference to ULC standards

- Limitations - Geometrically Defined Drainage Cavity
  - 10 mm geometrically defined drainage cavity width
  - Minimum 13% open

Figure A-9.27.13.1.1
Geometrically defined drainage cavity
New Residential Fire Warning Systems (ULC-S 540)

9.10.19.8. Residential Fire Warning Systems

- An additional acceptable solutions is added to address the use and installation of residential fire warning systems.
- **Smoke detectors** in lieu of Smoke alarm
  - Audible signals/ interconnected
  - Same Power supply requirements.
  - Equipped with silencing device
- **Previously** has to form part of fire alarm system.
- In **dwelling units** and Part 3-Small care occupancies
Changes in the NBC 2015 AB –Part 3
Alberta Specific – Part 3

Example of Alberta specifics that might be retained/added:

- Remove all conflicts that claims exemptions for un-sprinklered residential occupancy.
- Firewall Offsets.
- 11 meters maximum residential occupancy floor except for 3.2.2.50.
- Deleting occupancy classification (3.2.2.) for un-sprinklered residential occupancy.
- Respond time for Fire department (capable of beginning suppression).
- HIRF
- Visual signals requirements.
- Fire separation storage room less than $1m^2$ / Room with welding operation
- Roof access (Hatch, Stairs)
- Water Supply calculations (instead of NBC adequate water supply)
- Hose Connection 65mm instead of 64 mm
- Sprinklers head installation above NFPA 13 requirements (attic, balconies, etc.)
- FD connection (3 and 15 meters)
- No access to exit through kitchen service room (Assembly occupancies)
Fire Protection: Minimum Fire Rating of Cables in Air Plenums

3.1.4. Combustible Construction

- Change in the minimum rating
- Optic fibre cables and electric cables with combustible insulation in air plenums (for voice, sound and data) in combustible construction used to be FT4 now FT6
- Now consistent with optical fiber cables and electrical wires and cables in noncombustible construction
Penetration by Electrical and Non-Electrical Outlet Boxes

3.1.9.4. Penetration by Outlet Boxes

- **General Rule**: Fire Stop/FT rating same as Fire separation (combustible/non-combustible).

- **Non-combustible outlet boxes (no Fire stop required)**:
  - Single maximum opening 0.016 m² &
  - Maximum aggregate area of 0.065 m² /for every 9.3 m² &
  - Annular space membrane /outlet not more than 3mm

  *Exemption not applied for Firewalls & Horizontal Fire separation*

- **Opposite direction outlet boxes**:
  - Separated horizontally not less than 600 mm or
  - Fire block.
Self-Service Storage Buildings

Section 3.9. Self-service Storage Buildings

- **New Section**
  - Not more than one storey
  - External access only.
  - No basement or mezzanine
  - No other major occupancy.

*Example of the requirements:*

6) The floor area of self-service storage buildings shall be
a) subdivided into *compartments* not more than **500 m²** in area by a fire separation having a fire-resistance rating not less than **1 h**, or
b) sprinklered.

3) Subsection 3.2.3. need not apply ……., where the distance between these buildings is at **least 6 m**.
Protection of Foamed Plastics
3.1.4.2.(2) / 3.1.5.7. / 3.1.5.12. / 3.1.5.14. / 3.1.5.15.

- Several clarifications.
- **Combustible construction**
  - Walk-in cooler or freezer (Factory) — Foam
- **Non-combustible Construction**
  - Factory-Assembled Panels *(moved /detailed)*
  - New Article: Foamed Plastic Insulation *(split)*
- **Use of Specific wording; combustible insulation versus foam plastic insulation**
Combustible Components for Exterior Walls

3.1.5.5. Combustible Cladding on Exterior Walls
3.1.5.6. Combustible Components in Exterior Walls

- For non-combustible construction:
- Now two articles (to clarify requirements)
- Combustible cladding / used to be within combustible components (ABC2014)
Installation of Smoke Dampers

3.1.8.7. Location of Fire Dampers and Smoke Dampers
3.1.8.9. Smoke Dampers Waived
3.1.8.11. Installation of Smoke Dampers

- **New article**, previously only addresses Fire dampers only
- **To Prevent** smoke spreading into egress paths
- **In specific locations** (e.g. Public corridor)
- **Waived in other locations** (e.g. commercial kitchen)
- **Combination** of fire/smoke is also permitted
Installation of Closures

3.1.8.5. Installation of Closures

- Installation of a leakage-rated door assembly is now required:
  - Protection on floor area with Barrier free path of travel divide into 2 zones (compartments) 3.3.1.7.(1)(b),
  - B2 /B3 divided compartments - 1000 m² - 3.3.3.5.(2/4)
  - Public corridors serving dwelling units in storeys that are not sprinklered,
  - B1/B2/B3 Horizontal exit (compartment) in firewalls 3.3.3.5.(3).
Installation of Closures

3.1.8.5. Installation of Closures

- Leakage-rated door need not be installed where a *dwelling unit* served by a *public corridor* has
  - a) a second and *separate means of egress*, or
  - b) an *open-air balcony*.

- **Installation**: NFPA 105, “Smoke Door Assemblies and Other Opening Protectives.”

- **Tested to**: ANSI/UL-1784, “Air Leakage Tests of Door Assemblies and Other Opening Protectives.”

- Doors tested in accordance with UL 1784 are eligible to bear a mark that reads “*Smoke and Draft Control Door*” or the letter “*S*”
Hold-Open Devices (3.1.8.13.) & Integrated Fire Protection and Life Safety Systems (3.2.9.1.)

- The provisions were clarified to facilitate understanding and application of hold-open devices on closures in fire separations,
- New article (3.2.9.1.)- Used to be commissioning (3.2.4.6)

  Where fire protection and life safety systems and systems with fire protection and life safety functions are integrated with each other, they shall be tested as a whole in accordance with CAN/ULC-S1001, “Integrated Systems Testing of Fire Protection and Life Safety Systems,” to verify that they have been properly integrated & same for:

3.2.8.2. Exceptions to Special Protection

6) An interconnected floor space need not conform to the requirements of Articles 3.2.8.3. to 3.2.8.9. provided

   a) the interconnected floor space consists of the first storey and the storey next above or below it, but not both,

   b) the openings through the floor are used only for stairways, escalators or moving walks or the interconnected floor space is sprinklered throughout (see Appendix A),

   b) it is sprinklered throughout or, where the building area is not more than one half of the area permitted by Subsection 3.2.2., the openings through the floor are used only for stairways, escalators or moving walks (see Note A-3.2.8.2.(6)(b)), and

   c) the interconnected floor space contains only Group A, Division 1, 2 or 3, Group D, Group E, or Group F, Division 2 or 3 major occupancies (see Appendix A), and

   d) the building area is not more than one half of the area permitted by Subsection 3.2.2.
Mezzanines and Openings through Floor Assemblies—**Major change**

3.2.8.3. Construction Requirements

3.2.8.1. Application

1) ........the portions of a floor area or a mezzanine that do not terminate at an exterior wall, a firewall or a vertical shaft shall

- a) terminate at a vertical fire separation ........, or
- b) be protected in conformance with the requirements of Articles 3.2.8.3. to 3.2.8.8.

---

1) A building constructed in conformance with Articles 3.2.8.4. to 3.2.8.9. shall be of **noncombustible construction**, except that heavy timber construction is permitted if Subsection 3.2.2. permits the building to be constructed of combustible construction.

- The limitation for noncombustible construction in the presence of interconnected floor space is removed.
Exit Width of Principal Entrances

3.4.2.6. Principal Entrances

- In a building that is not sprinklered ... the principal entrance serving a Dance hall/Bar ... with an occupant load more than 250 ... shall provide at least one half of the required exit width.

- The principal entrance must account for at least one half of the required occupant load even if the building has more than 2 entrances (exits).
Handrails for Aisles with Steps - New

3.3.2. Assembly Occupancy
3.3.2.10. Handrails in Aisles with Steps

Assembly Occupancy
1) Handrails shall be provided in aisles with steps in conformance with Table 3.3.2.10

Handrails are required in assembly occupancies in locations where aisles incorporate steps

- Continuous side handrail
- Handrail at each row of seats and Continuous side handrail
- Central handrail

Aisle Less than 1100 mm
Aisle is 1100 mm or more
Aisle is 1100 mm or more
Emergency crossover access to floor areas

3.4.6.18. Emergency Crossover Access to Floor Areas

ABC 2014

3.4.6.18. Emergency Access to Floor Areas

- Reworded
- Updated and clarified
- Electromagnetic locks permitted
Distance between exterior discharges of exits - New

3.4.2.3. Distance between Exits

4) The distance between 2 exterior discharges of exit stairs serving the same floor area shall be

a) not less than 9 m, or

b) not less than 6 m, where

i) the building is sprinklered throughout, and

ii) the 2 exterior discharges are located within 15 m of a street.
Stairs - Ornamental guards

3.3.1.18.(4) Guards

- **Part 3**: Permitted when protecting a level not more than one storey or a level less than 4.2 m above adjacent level, if more design as per 9.8.8.6.(140-900mm)

- Opening through guards shall still be of a size that prevents the passage of a spherical object having a diameter of 100 mm or 3 7/8 inch or less.
Stairs, Handrails and Guards

3.4.6.5. Handrails
3.4.6.6. Guards
3.4.6.8. Treads and Risers

- "graspable portion" for non-circular cross section handrails is now deleted – for clarity.
- non-circular cross-section with a graspable portion perimeter not less...
- The height of guards serving a flight of exit stairs in Part 3 and Part 9 is harmonized – 1070 mm (Previously 920 mm Part 3 and 1070 mm Part 9)
- The use of open risers in public stairs is prohibited, permitted in dwelling units and industrial occupancies.
Accessibility
Section 3.8. Accessibility

3.8.1.1. Scope

2) Buildings and facilities required to be barrier-free in accordance with Subsection 3.8.2. shall be designed in accordance with Subsection 3.8.3.

3.8.3.1. Design Standards

1) Buildings or parts thereof and facilities that are required to be barrier-free shall be designed in accordance with

a) this Subsection, or

b) the provisions of CSA B651, “Accessible Design for the Built Environment,” listed in Table 3.8.3.1., in their entirety.

Table 3.8.3.1.
Barrier-free Design Provisions
Forming Part of Sentence 3.8.3.1.(1)

<table>
<thead>
<tr>
<th>Barrier-free Application (Code References)</th>
<th>Applicable CSA B651 Provisions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interior accessible routes (3.8.3.2.)</td>
<td>4.3 and 5.1</td>
</tr>
<tr>
<td>Exterior accessible routes (3.8.3.3.)</td>
<td>8.2.1 to 8.2.5 and 8.2.7</td>
</tr>
<tr>
<td>Passenger pickup areas (3.8.3.4.)</td>
<td>9.3</td>
</tr>
<tr>
<td>Ramps (3.8.3.5.)</td>
<td>5.3 and 5.5</td>
</tr>
<tr>
<td>Doors and doorways (3.8.3.6.)</td>
<td>5.2</td>
</tr>
</tbody>
</table>
Changes in the NBC 2015—Part 5
Curtain Walls, Window Walls, Storefronts and Glazed Architectural Structures

5.9.3. Other Fenestration Assemblies

5.9.3.2. Structural and Environmental Loads
5.9.3.3. Heat Transfer
5.9.3.4. Air Leakage
5.9.3.5. Water Penetration

- **Minimum performance requirements**
- **Laboratory and in-situ testing procedures**
- **Notes to Part 5**
5.9.4. Exterior Insulation Finish Systems

- **New subsection**
- Notes to Part 5 addresses EIFS and provides guidance on EIFS design and construction.
- **CAN/ULC-S716.3**, “Exterior Insulation and Finish System (EIFS) - Design Application.”
Wind Uplift Resistance of Membrane Roofing Assemblies

5.2.2.2. Determination of Wind Load

- Existing article in ABC 2014:
- New standard CAN/CSA-A123.21 ”Wind uplift resistance of membrane roofing”
- Dynamic nature of roof membranes.
- Applies only to membrane roofing systems whose components’ resistance to wind uplift is achieved by fasteners or adhesives.
- It does not apply to roofing systems that use ballasts, such as gravel or pavers, to secure the membrane against wind uplift.
Vegetated Roofing Systems

5.6.1.2. Installation of Protective Materials

- **Material that provides protection from precipitation** need to be tested “for resistance to root and rhizome penetration.”

- **New standard ANSI/GRHC/SPRI VR-1**
The Apparent Sound Transmission Class (ASTC) is introduced to take into account flanking sound transmission in addition to the direct sound transmission.

Calculations of ASTC
- Measurement to ASTM
- Calculations
  - Detailed
  - Simplified

Dwelling compliance
- ASTC 47
- or 50 STC (Tables 9.10.3.1.A/B) + Construction requirements of 9.11.1.4
- Dwelling /elevator shaft or refuse 55 STC
Section 5.8. Sound Transmission (A-9.11.1.4.-A)
Construction requirements of 9.11.1.4
Changes in the NBC 2015—Part 6
Drain Pans

6.3.2.2. Drain Pans

- Drain pans beneath (for condensation)
  - Dehumidifying cooling coil assemblies
  - Condensate-producing heat exchangers
- Standard (design):
  - Section 5.11, Drain Pans, of ANSI/ASHRAE 62.1,
- Outlet that is piped to the outside of the airstream in a location where condensate can be eliminated, and
- Water drains freely from the pan.

ANSI/ASHRAE 62.1(07)

5.11 Drain Pans. Drain pans, including their outlets and seals, shall be designed and constructed in accordance with this section.

5.11.1 Drain Pan Slope. Pans intended to collect and drain liquid water shall be sloped at least 0.125 in. per foot (10 mm per meter) from the horizontal toward the drain outlet or shall be otherwise designed to ensure that water drains freely from the pan whether the fan is on or off.

5.11.2 Drain Outlet. The drain pan outlet shall be located at the lowest point(s) of the drain pan and shall be of sufficient diameter to preclude drain pan overflow under any normally expected operating condition.

5.11.3 Drain Seal. For configurations that result in negative static pressure at the drain pan relative to the drain outlet (such as a draw-through unit), the drain line shall include a P-trap or other sealing device designed to maintain a seal against ingestion of ambient air while allowing complete drainage of the drain pan under any normally expected operating condition, whether the fan is on or off.

5.11.4 Pan Size. The drain pan shall be located under the water-producing device. Drain pan width shall be sufficient to collect water droplets across the entire width of the water-producing device or assembly. For horizontal airflow configurations, the drain pan length shall begin at the leading face or edge of the water-producing device or assembly and extend downstream from the leaving face or edge to a distance of either:

a. one half of the installed vertical dimension of the water-producing device or assembly, or
b. as necessary to limit water droplet carryover beyond the drain pan to 0.0044 oz per ft² (1.5 mL per m²) of face area per hour under peak sensible and peak dew point design conditions, considering both latent load and coil face velocity.
### Separation Distances of Exhaussts and Outdoor Air Intakes

6.3.2.9. Supply, Return, Intake and Exhaust Air Openings

- **New Table**

<table>
<thead>
<tr>
<th>Source of Contaminants</th>
<th>Minimum Distance of Outdoor Air Intake, m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Garage entry of a garage for 5 or more motor vehicles, automobile loading area and drive-in queue</td>
<td>4.5</td>
</tr>
<tr>
<td>Truck loading area or dock, and bus parking</td>
<td>7.6</td>
</tr>
<tr>
<td>Driveway, street, and parking space</td>
<td>1.5</td>
</tr>
<tr>
<td>Thoroughfare, arterial road, freeway, and highway</td>
<td>7.6</td>
</tr>
<tr>
<td>Garbage storage/pick-up area and dumpsters</td>
<td>4.5</td>
</tr>
<tr>
<td>Discharge from evaporative cooling tower, evaporative fluid cooler and evaporative condenser</td>
<td>7.6</td>
</tr>
<tr>
<td>Sanitary vent</td>
<td>3.5</td>
</tr>
<tr>
<td>Kitchen cooking exhaust</td>
<td>3.0</td>
</tr>
<tr>
<td>Vent for combustion products</td>
<td>3.0</td>
</tr>
</tbody>
</table>
Changes in the NFC 2015
4.2.12. Self-Service Storage Buildings

The scope of Section 3.9. of NBC 2015

- **4.2.12.2. Maximum Quantities**
  - Max. 50 L of *flammable liquids and combustible liquids*, max. 30 L shall be Class I liquids stored in individual self-service storage units

- **4.2.12.3. Dispensing and Handling**
  - not permitted
Other Changes

- Dangerous Goods Classification: Harmonizes with GHS-WHIMIS
- Storage Tanks: Storage Tank Repair and Refurbishment /New standard.
- Hot Works: Location of Operations /Low & high tech. inspection
- Dangerous Goods: Laboratories
  - Placard Use/Clarification
  - Interlocking of the Enclosure Exhaust Ventilation System with the Fire Alarm System
  - Dangerous Goods Maximum Quantities/Store and in use operation
  - Containers/For storage to conform to 4.2.3.
Changes in the NPC 2015
Water-use Efficiency: Supply Fittings and Shower Heads

2.2.10.6. Supply and Waste Fittings

2) Except for lavatories in health care facilities, emergency eye washes, and emergency showers, supply fittings and individual shower heads shall have an integral means of limiting the maximum water flow rate to that specified in Table 2.2.10.6.

### Table 2.2.10.6.
Water Flow Rates from Supply Fittings
Forming Part of Sentence 2.2.10.6.(2)

<table>
<thead>
<tr>
<th>Supply Fittings</th>
<th>Maximum Water Flow Rate, L/min</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lavatory supply fittings</td>
<td></td>
</tr>
<tr>
<td>private</td>
<td>5.7</td>
</tr>
<tr>
<td>public</td>
<td>1.9</td>
</tr>
<tr>
<td>Kitchen supply fittings (except those in industrial, commercial or institutional kitchens)</td>
<td>8.3</td>
</tr>
<tr>
<td>Shower heads</td>
<td>7.6</td>
</tr>
</tbody>
</table>
Water-use Efficiency: Plumbing Fixtures

2.6.1.6. Flushing Devices

3) Except as provided in Sentence (4), water closets and urinals shall have an integral means of limiting the maximum amount of water used in each flush cycle to that specified in Table 2.6.1.6.

Sentence (4) – Residential Retrofit.

<table>
<thead>
<tr>
<th>Fixtures</th>
<th>Maximum Water Usage per Flush Cycle, Lpf</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water closets – residential</td>
<td>4.8</td>
</tr>
<tr>
<td>single-flush</td>
<td>4.8</td>
</tr>
<tr>
<td>dual-flush: 6.0/4.1 Lpf</td>
<td>4.8</td>
</tr>
<tr>
<td>Water closets – industrial, commercial, institutional</td>
<td>6.0</td>
</tr>
<tr>
<td>Urinals</td>
<td>1.9</td>
</tr>
</tbody>
</table>
No more detailed trade off

Section 3.3. Trade-off Path

3.3.4. Detailed Trade-off Path

Modelling the building envelope is not an option for compliance in the prescriptive path.

Now, the only option is the Simple Trade-off Path
New thermal requirements for semi-heated buildings

1.2.1.2. Defined Terms

2) For the purposes of this Code, a semi-heated building is considered to be a building with a design set-point temperature of less than 15°C.

Requirements are all around e.g.

2) ……the overall thermal transmittance of above-ground opaque building assemblies in semi-heated buildings, as defined in Sentence 1.2.1.2.(2), shall be not more than that shown in Table 3.2.2.2. …..assembly, for the applicable heating-degree-day category taken at 15°C.

Remember:

Trade off does not apply to additions or to semi-heated buildings, as defined in Sentence 1.2.1.2.(2).

Table 3.2.2.2 (Continued)
A performance level for air barrier assemblies

3.2.4.2. Opaque Building Assemblies

NECB 2011: an air barrier assembly is required, no prescriptive or measurement method.

NECB 2015:

Air barrier assemblies conforms to CAN/ULC-S742, “Air Barrier Assemblies – Specification,” and an air leakage rate no greater than 0.2 L/(s·m²) at a pressure differential of 75 Pa. OR

Air barrier assemblies tested in accordance with ASTM E 2357, “Determining Air Leakage of Air Barrier Assemblies,” to meet the air leakage requirement stated in Sentence above, provided the 1-in-50 hourly wind pressures do not exceed 0.65 kPa, and the air barrier installed on the warm side of the thermal insulation.
**Updated max (LPD)**

4.2.1.5. Calculation of Interior Lighting Power Allowance Using the Building Area Method

<table>
<thead>
<tr>
<th>Building Type</th>
<th>NECB 2015</th>
<th>NECB 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hotel</td>
<td>9.4</td>
<td>10.8</td>
</tr>
<tr>
<td>Hospital</td>
<td>11.3</td>
<td>13.0</td>
</tr>
<tr>
<td>Warehouse</td>
<td>7.1</td>
<td>7.1</td>
</tr>
<tr>
<td>Library</td>
<td>12.8</td>
<td>12.7</td>
</tr>
</tbody>
</table>

Harmonizing with ASHRAE 90.1-2013
Updated piping and duct insulation requirements

5.2.5.3. Piping Insulation

HVAC piping that conveys fluids with design operating temperatures greater than 13°C 16°C and less than 41°C need not comply with Table 5.2.5.3., if it is located within a conditioned space.

“meaning no insulation is required around piping”

The insulation thickness used to determine compliance with Table 5.2.5.3. shall be the thickness of the insulation after installation.
Heat Rejection

5.2.12.2. Heat Rejection Equipment

New article (*performance requirements for standalone heat rejection equipment)

Cooling towers, Fluid coolers and Condensers,

Categories:

- “Direct-contact”
- “Indirect-contact”
- “Air-cooled”

*Maximum allowed total motor power demand.
New prescriptive requirements for gas-fired outdoor packaged units (such as rooftop units)

<table>
<thead>
<tr>
<th>Component or Equipment</th>
<th>Cooling or Heating Capacity, kW (Btu/h)</th>
<th>Standard</th>
<th>Minimum Performance(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas-fired outdoor packaged units</td>
<td>&gt; 65.9 kW (225 000) and &lt; 2 930 kW (10 000 000)</td>
<td>CAN/CSA-P.8(8)</td>
<td>Et ≥ 80%</td>
</tr>
</tbody>
</table>
Updated performance requirements in the mechanical and service water tables

5.2.12.1. Unitary and Packaged HVAC Equipment
6.2.2.1. Equipment Efficiency

Mainly to align with the federal Equipment Efficiency Regulations.

e.g.

**Added** electric instantaneous - $\text{Et} \geq 98\%$

**Added** gas instantaneous - $\text{EF} \geq 0.8$
Reduced hot water discharge rate for showers and lavatories

6.2.6. Hot Service Water

6.2.6.1. Showers
1) Except for emergency eye washes and emergency showers, individual shower heads shall have an integral means of limiting the maximum water flow rate to 9.5 - 7.6 L/min when tested in accordance with ASME A112.18.1/CSA B125.1, "Plumbing Supply Fittings."

6.2.6.2. Lavatories
1) Except for lavatories in health care facilities and emergency eye washes, lavatories shall have an integral means of limiting the maximum water flow rate to 8.3 - 5.7 L/min for private use and 1.9 L/min for public use, when tested in accordance with ASME A112.18.1/CSA B125.1, "Plumbing Supply Fittings."

Aligned with NPC 2015 –as previously indicated.
Demand control ventilation

5.2.3.4. Demand Control Ventilation Systems

Enclosed semi-heated spaces or *conditioned spaces* where *fuel-powered vehicles* or *mobile fuel-powered equipment* or *appliances* are intermittently used shall be provided with *sensors* and *demand control ventilation systems* capable of *limiting* the expected air *contaminants* to acceptable levels by

a) **Staging On-Off**/ dedicated *ventilation fans*, or

b) **Modulating** the outdoor *airflow rates* - **Variable speed**.

- Indoor storage garage
- Ice Rink-ice surfacing
- Warehouse-forklift
Significant Changes in the NECB 2017
Energy Efficiency Improvements

Modeling for the changes in the NECB 2017 indicated a potential energy improvement of 10.3 to 14.4 % over NECB 2011

Important step towards Canada’s goal for new buildings as presented in the Pan Canadian framework on clean growth and climate change.
Part 3 Building Envelope
What's new?

News standards and options for Thermal characteristic of building assemblies calculation

- e.g. **BC Hydro**: Building Envelope Thermal Bridging Guide.
- Using Building Envelope Thermal Analysis (BETA)
  - e.g. **ASHRAE RP-1365**: Thermal Performance of building envelope details for mid- and High rise.
  - e.g. **ISO 14683** Thermal Bridging in building Construction.

The option to use two- or three-dimensional thermal modeling.
**What's new?**

Lowered U value for Roofs (increased R values); for all Zones  
*e.g. Zone 7A*

<table>
<thead>
<tr>
<th></th>
<th>NECB 2011</th>
<th>NECB 2015</th>
<th>NECB 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walls</td>
<td>0.21</td>
<td>0.21</td>
<td>0.21</td>
</tr>
<tr>
<td>Roofs</td>
<td>0.162</td>
<td>0.162</td>
<td>0.138</td>
</tr>
<tr>
<td></td>
<td><strong>RSI 6.17 (R35)</strong></td>
<td></td>
<td><strong>RSI 7.24 (R41)</strong></td>
</tr>
<tr>
<td>Floors</td>
<td>0.162</td>
<td>0.162</td>
<td>0.162</td>
</tr>
</tbody>
</table>
What's new?

Lowered U value for Fenestration and Doors; (increased R values) for all Zones

<table>
<thead>
<tr>
<th></th>
<th>NECB 2011</th>
<th>NECB 2015</th>
<th>NECB 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALL</td>
<td>2.2</td>
<td>2.2 (RSI 0.45 – R 2.56 )</td>
<td>1.9 (RSI 0.52 – R 2.95)</td>
</tr>
<tr>
<td>Doors</td>
<td>2.2</td>
<td>2.2 (RSI 0.45 – R 2.56 )</td>
<td>1.9 (RSI 0.52 – R 2.95)</td>
</tr>
</tbody>
</table>

No change for Below ground assemblies.
Part 4 Lighting
What's new?

**Decreased LPD**

For both Building area and Space by space method

<table>
<thead>
<tr>
<th>Building Type</th>
<th>NECB 2017</th>
<th>NECB 2015</th>
<th>NECB 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hotel</td>
<td>8.1</td>
<td>9.4</td>
<td>10.8</td>
</tr>
<tr>
<td>Hospital</td>
<td>11.3</td>
<td>11.3</td>
<td>13.0</td>
</tr>
<tr>
<td>Warehouse</td>
<td>5.2</td>
<td>7.1</td>
<td>7.1</td>
</tr>
<tr>
<td>Library</td>
<td>8.4</td>
<td>12.8</td>
<td>12.7</td>
</tr>
</tbody>
</table>

**Added exemption** for night lighting in washrooms (max 2 W) to shut off within 20 minutes of the space being unoccupied.
What's new?

Reduced Base Site Allowance for Exterior Lighting

<table>
<thead>
<tr>
<th>Zone</th>
<th>NECB 2017</th>
<th>NECB 2015</th>
<th>NECB 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>900 W</td>
<td>1300</td>
<td>1300</td>
</tr>
<tr>
<td>3</td>
<td>500 W</td>
<td>750</td>
<td>750</td>
</tr>
<tr>
<td>2</td>
<td>400 W</td>
<td>600</td>
<td>600</td>
</tr>
<tr>
<td>1</td>
<td>350 W</td>
<td>500</td>
<td>500</td>
</tr>
</tbody>
</table>

Reduced LPD / LP allowance for Specific and General exterior applications

<table>
<thead>
<tr>
<th>Application</th>
<th>NECB 2017</th>
<th>NECB 2015</th>
<th>NECB 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive Through (DT)</td>
<td>200 W/DT</td>
<td>400 W/DT</td>
<td>400 W/DT</td>
</tr>
<tr>
<td>ATM machines</td>
<td>135 W + 45 for additional</td>
<td>270 + 90W for additional</td>
<td>270 + 90W for additional</td>
</tr>
</tbody>
</table>
Part 5 HVAC
What's new?

**Demand Control Ventilation Systems**

**NEW!** Commercial Kitchen where exhaust fan air flow rate design exceeds or meets certain values shall be equipped with demand control ventilation systems.

**Why?**

**Energy Burden**

To Reduce the design exhaust and make up air flow rates at least 50% in response to appliance operation.

**Temperature Control in guest rooms and suites in commercial temporary lodging.**

Shall be controlled so its is automatically adjusted to a set back temperature within 15 minutes of the space being unoccupied.
What's new?

**Energy Recovery systems:**

- Change name from *Heat Recovery ventilation* to *Energy recovery systems*
- Clarified (e.g. if exhaust design exceeds or meets certain values, it shall be equipped with energy recovery system.
- Tables for continuous and non-continuous ventilation.
- Ventilation systems that operates less than 8000 hours per year are considered non-continuously operating.
Thank you

Questions
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