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From **Discovery**
to **Innovation...**

2010 NATIONAL MODEL CONSTRUCTION CODES

Other Part 9 Changes

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National Research
Council Canada

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de recherches Canada

Canada

Introduction



- Presentation is part of a series on the 2010 National Model Construction Codes
- Model codes developed by Canadian Commission on Building and Fire Codes
- These codes must be adopted by provincial/territorial authorities to become law

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This Presentation is part of a series of 13 on the 2010 National Model Construction Codes.

It is important to note that the model codes, which are developed by the Canadian Commission on Building and Fire Codes must be adopted by provincial/territorial authorities to become law.

This may mean that code requirements enacted by legislation within your province or territory might differ from what is presented here.

Please check with your local authority.

Changes to Part 9



- Live Loads due to Use and Occupancy
- Sound and Fire Resistance Ratings
- Dampproofing
- Foundation Walls
- Low Permeance Materials
- Heating and Ventilation
- Definition of Range
- Spans for Steel Beam
- Referenced Standards
- Minor Tasks
- Climatic Data

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Here is a list of subjects that we will touch on in this presentation:

[Read list]

Live Loads – Use & Occupancy



- Rationale
 - Consistency with Part 4
 - Clarification
- Changes
 - Guards for floors and ramps in garages
 - Vehicle guardrails shall be designed for concentrated horizontal load of 22 kN applied outward at any point 500 mm above floor surface
 - Specified loads for guards
 - Clarified that loads to be applied at minimum required height and not top of guard



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This changes makes a Part 4 – Part 9 Difference more consistent

Part 4 specifies a minimum loading for vehicle guardrails.

A parallel requirement is not provided in part 9.

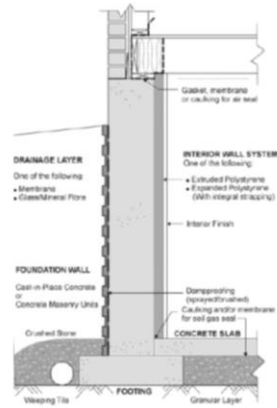
Part 9 now specifies the same minimum horizontal concentrated load for vehicle guardrails consistent with Part 4.

It was also clarified that loads are to be applied at the minimum required height and not the top of the guard

Dampproofing



- Rationale
 - New products that fulfill multiple functions
 - Correct referencing of acceptable solution
- Changes
 - Title now
“Moisture Protection for Interior Finishes”
 - Additional acceptable solution for moisture protection of interior finishes
 - Deleted incorrect exemption
 - Moved gravel requirements directly into this section



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This change is located under the title “Interior Dampproofing”.

This could be a little misleading, because the real purpose of the requirements is to protect interior finishes from moisture

while “dampproofing” is generally assumed to be the protection from exterior moisture.

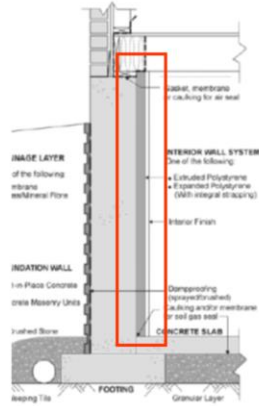
In addition:

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Dampproofing



- Rationale
 - New products that fulfill multiple functions
 - Correct referencing of acceptable solution
- Changes
 - Title now
“Moisture Protection for Interior Finishes”
 - **Additional acceptable solution for moisture protection of interior finishes**
 - Deleted incorrect exemption
 - Moved gravel requirements directly into this section



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some types of insulation can also fulfill the function of moisture protection of interior finishes and achieve the performance intended by the prescriptive requirements

These products are now recognized.

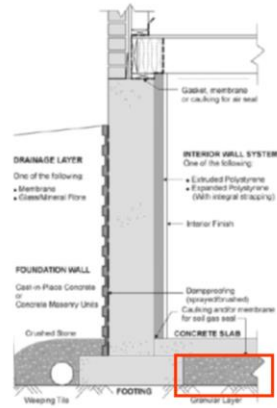
An Appendix Note provides further explanations

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Dampproofing



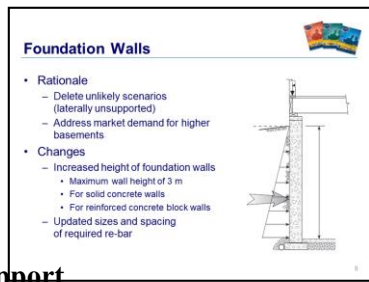
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A reference to Section 9.16 for requirements for clean granular fill has been deleted because it was difficult to deal with exceptions to these requirements for other purposes.

but the information is now provided directly in this provision.



9.15.4.2. Foundation Wall Thickness and Required Lateral Support

Increase height of foundation walls

The application of the 2005 Table 9.15.4.2.A. was limited to foundation walls with a total height of 2.5 m and backfill height of 2.4 m.

Because there is a market demand for higher basements with higher backfill the code now permits walls up to 3.0 m high.

The change the Table (9.15.4.2.A.) provides the foundation wall thicknesses and heights for solid concrete walls (unreinforced) and back-fill heights up to up to 3.0 m high.

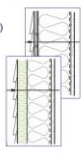
A similar change (Table 9.15.4.2.B.) provides foundation wall thicknesses and heights for reinforced concrete block walls and back-fill heights up to up to 3.0 m high.

Reinforcing Sizes and Spacing

In CSA-S304.1, “Design of Masonry Structures”, changes have been made to the load resistance of masonry. The specified bar sizes are heavy and difficult to handle, and no options are provided. The new criteria recognize the changes in load resistance of masonry. They specify lighter re-bars for easier handling and provide options in some cases.

Low Permeance Materials

- Rationale
 - Review application limits (35% & 60% interior RH)
 - Energy retrofits often use exterior low-permeance insulation
 - Clarify most misunderstood Section in Part 9
- Changes
 - Clarified code structure
 - Introduced concept of “normal conditions” instead of 35%-60% interior RH
 - Addressed foamed plastics as vapour barrier



Here is an overview of the changes in Section 9.25 for materials with low air or vapour permeance values. The changes were prompted by the fact that 9.25 is probably the most misunderstood section in Part 9. But also because low permeance materials - for example extruded polystyrene foam board - are more often used now for energy retrofits.

The changes I am going to explain deal with

- Clarification in the Scope and Application
- a more transparent structure of this section
- a new concept of using the expression “Normal Conditions” instead of 35% - 60% relative humidity
- and some changes that help the use of Foamed Plastic products when they are used as Vapour Barrier

Low Permeance Materials



- Scope and application (unchanged)
 - Heat, air and water vapour transfer and condensation control
 - All walls, ceilings and floors separating conditioned space from unconditioned space, exterior air or ground
- New structure
 - Scope and application 9.25.1.
 - Thermal insulation 9.25.2.
 - An air barrier 9.25.3.
 - A vapour barrier 9.25.4.
 - Low permeance materials 9.25.5.

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Scope and Application (unchanged)

The Scope and Application of this section remain unchanged, Section 9.25 still deals with

Heat, air and water vapour transfer and condensation control

And deals with

all walls, ceilings and floors separating conditioned space from unconditioned space, the exterior air or the ground

New structure

The new structure is an editorial change, that wants to make clear that the requirements for the location and properties of low permeance materials apply in addition to requirements for air & vapour barriers and insulation

The application provision in Sentence 9.25.1. (1) now almost appears as a roadmap through Section 9.25.

Low Permeance Materials



- ~~Mild climate locations up to 60% RH~~ ~~Part 9~~
- ~~Cold climate locations up to 35% RH~~ ~~Part 9~~
- “Normal conditions”
 - [Part 9](#) construction for vapour barrier and low permeance materials applies [under normal conditions](#)
 - Examples: typical residential occupancies, and business and personal services occupancies (including typical bathrooms and showers, etc.)
 - [Part 5](#) design of building envelope assemblies applies to [high-moisture conditions](#)
 - Examples: swimming pools, greenhouses, laundromats, and any continuous operation of hot tubs and saunas

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The requirement for both vapour barriers and materials with low permeance is based on the assumption that the building assembly is only subjected to conditions that are considered normal for typical residential occupancies, business and personal services occupancies.

However, where the intended use of an occupancy includes facilities or activities that will generate a substantial amount of moisture indoors during the heating season, such as swimming pools, greenhouses, laundromats, and any continuous operation of hot tubs and saunas, the building envelope assemblies would have to demonstrate acceptable performance levels in accordance with the requirements in Part 5.

We will see in the following two slides how this concept was implemented for the requirements for vapour barriers and for low permeance materials

Low Permeance Materials



- “Normal conditions”
 - Vapour barriers
 - Insulated wall, floor and ceiling assemblies
 - [Under normal conditions](#)
 - Exceptions:
 - [Intended use includes high moisture generation](#) ⇨ [Part 5](#)
 - ~~During heating season~~
 - ~~Mild climate locations with interior relative humidity over 60%~~
 - ~~Cold climate locations with interior relative humidity over 35%~~ ⇨ [Part 5](#)

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Vapour barriers

Current requirements use the mild climate indicator and interior humidity as criteria whether a building envelope design can follow Part 9 requirements or whether It has to be designed to Part 5

The determination of relative humidity is not very easy to enforce at the time the materials for the building envelope are selected and inspected. This might lead builders and officials to assume interior conditions. Interior Relative humidity is still the criterion that determines the applicability of these requirements, but now it is linked to occupancies classifications and key building features, which are more known at the time of construction.

Low Permeance Materials



- “Normal conditions”
 - [9.25.5. Low Permeance Materials](#)
 - Location of materials installed
 - Properties of materials installed
 - [Under normal conditions](#)
 - Exceptions:
 - Insulation and sealing of ducts (9.32. / 9.33.)
 - [Intended use includes high moisture generation](#) ⇔ [Part 5](#)
 - ~~During heating season~~
 - ~~Mild climate locations with interior relative humidity over 60%~~
 - ~~Cold climate locations with interior relative humidity over 35%~~ ⇔ [Part 5](#)

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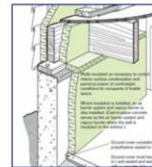
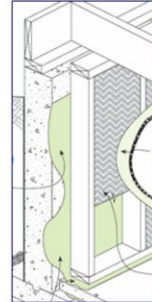
Low Permeance Materials

The same change was implemented for the requirements for location and properties of low permeance materials

Low Permeance Materials



- Installation of vapour barriers
 - Products installed to function as the vapour barrier shall protect the warm side of wall, ceiling and floor assemblies
 - Where the vapour barrier and insulation are different products, the vapour barrier shall be installed sufficiently close to the **warm side of the insulation** ...
 - Where the vapour barrier and insulation are the same product, the product shall be installed sufficiently close to the **warm side of the assembly**...
... to prevent condensation at design conditions



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This change is trying to clarify the vapour barrier requirements for products that fulfill more than one function, for example the function of insulation and vapour barrier and air barrier.

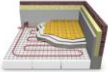

It now differentiates between situations where vapour barrier and insulation are different products, the vapour barrier shall be installed sufficiently close to the **warm side of the insulation**

Where the vapour barrier and insulation are the same product, the product shall be installed sufficiently close to the **warm side of the assembly**...

Both requirements have the same goal to prevent condensation at design conditions

Heating & Ventilation

- Hydronic heating
 - Reference CSA B214 Installation Standard
 - Reference Canadian Hydronics Council Handbook
- Definition of “mechanically vented”
 - Included induced-draft appliances and power-vented appliances
 - Clarified what is exempt from make-up air requirements

Hydronic Heating is becoming more popular and there are a lot of issues that have to be considered when installing such a system

The code now references CSA-B214, for the Installation of Hydronic Heating Systems if no other provincially or territorial regulations or municipal bylaws are in place.

An appendix note also references the Canadian Hydronics Council Handbook that describes good practices in the design of hydronic heating systems. The handbook also provides additional information to the CSA standard.


Definition of “Mechanically Vented”

The current definition of the term “mechanically vented” can be interpreted to exclude induced-draft and power-vented appliances because these types of appliances do not connect directly to a totally enclosed independent passageway. As a result, there is confusion and inconsistency in the application of these requirements.

The code now defines “mechanically vented appliances” to include induced-draft and power-vented appliances, consistent with related Appendix notes.

Range vs. Cooktop

- Rationale
 - Definition of range did not address cooktops
 - Requirements applied equally to cooktops
- Changes
 - Changed definition to describe "cooktop"
 - Replaced instances of "range" with
 - "cooktop", or
 - "cooktop and oven"
 - Changes apply mainly to protection of combustible materials around cooking appliances



The definition of range was changed to the definition for cooktop, it reads

Cooktop means a cooking surface having one or more burners or heating elements.

All occurrences of the term range were replaced with either cooktop or with cooktop and oven depending on what the requirements were about.

The new term is a more commonly used term and more correctly spells out what the requirements address.

The changes apply mainly to protection of combustible materials around cooking appliances

You can see in the illustration to the right that the requirements in this case refer to the distance of cabinetry from the cooktop surface, it really doesn't matter whether an oven is provided below or not

Frank,

Figure A-9.10.22. still refers to Clearances from ranges to walls and cabinetry!

Nedjma

Good point - Let's make that our first Revision and Errata ;-)

Fire and Sound Resistance Ratings



- **Rationale**

- Limiting application of Tables
- New research data

- **Changes**

- Additional ratings and assemblies for Tables A-9.10.3.1.A. and B.
- Added footnotes to Table A-9.10.3.1.A. and B.
 - Limit application of ratings to wood I-joists made with phenolic adhesives (Table A-9.10.3.1.B.)
 - Allow finger-jointed studs (HRA stamped) (Table A-9.10.3.1.A.)

Fire-Resistance Rating ⁽¹⁾		Typical Sound Transmission Class ⁽¹⁾⁽²⁾
Loadbearing	Non-Loadbearing	
45 min	1 h	56

- **Impact**

- Applies to rated assemblies in Part 9 Buildings

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There were a number of changes related to the Tables in appendix A that list fire and sound ratings for walls and floors

The first change was that we included a number of new ratings and assemblies that came from a research project.

The second changes was that few notes were introduced to Tables that specify certain conditions that have to be met before the values in the tables can be used for assemblies in the field.

Table A-9.10.3.1.B.

One note limits the application of some assemblies (floor, ceiling and roof) in the table to wood I-joists fabricated with phenolic adhesives.

The note highlights that the use of adhesives other than phenolic could compromise the performance of required fire separations.

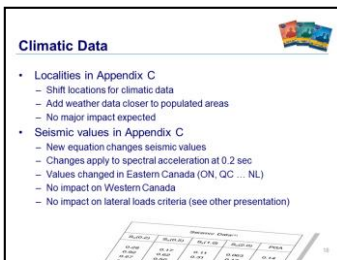
This note was so important that the Provincial-Territorial Policy Advisory Committee on Codes (PTPACC) and their respective subcommittees have been advised of this.

Table A-9.10.3.1.A.

Another note states that where the table specifies wood studs, that finger-jointed studs can be used for the purpose of the fire ratings for wall assemblies.

However, the studs have to be stamped “HRA” which means heat resistance adhesive.

And - this does not mean that fingerjointed studs can be used in place of solid lumber studs for structural purposes.



Some Localities were added in the climatic data in Appendix C

And some were changed to other locations that were closer to populated areas

The Seismic Values in Appendix C for houses and small buildings have also been slightly changed

A new equation was used to calculate the seismic values for low-rise buildings, which is called “spectral acceleration at 0.2 sec”

You can see it below in the screenshot from the Appendix C table – all the way on the left

This change has led to some differences in the values for Eastern Canada (ON, QC ... NL) but have no impact on Western Canada.

another presentation in this series talks about the seismic values in a a lot more detail

Referenced Standards Update



- Normal process for currently referenced standards
 - All editions published by September 30, 2009
 - Update standards once per code cycle
- Proposed change process
 - Concrete [CSA A23.1 \(A438\)](#)
 - Termite and Decay Protection new CSA O80
 - Steel Framing Standard [AISI/COFS \(CGSB\)](#)
 - Steel Screws Standard [ASTM C 954](#)
 - Sealant Standards [ASTM \(CGSB\)](#)
 - ~~Asbestos Siding Standards~~ ~~Various CGSB~~

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There is usually one Update to referenced standards once per code cycle when new editions of standards will be referenced

The other process involves a more detailed review when significant changes are implemented into existing standards or where new standards are proposed to be added to the code

Here are some examples:

The requirements for concrete in Section 9.3 now reference [CSA A23.1](#) and [note \(CSA A438\)](#) anymore

The standard for Termite and Decay Protection CSA O80 has been substantially renewed and the code requirements had to be changed to be consistent

A new Steel Framing Standard is now referenced. The [AISI/COFS](#) standard replaces an outdated (~~CGSB~~) standard

A new standard for Steel Screws [ASTM C 954](#) is now referenced

[And a number of ASTM](#) Sealant Standards replace the outdated (~~CGSB~~) standards in Part 5 and Part 9

Spans for Steel Beams



- Expanded assumptions in Appendix Note
 - Spans reflect
 - balance of engineering and
 - acceptable proven performance
 - List factors and assumptions
 - Span calculation applies a revised live load reduction factor to account for lower probability of a full live load in Part 9 buildings

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The assumptions for the calculation of spans for steel beams that stated in Appendix note have been expanded.

It was already clear that the Spans reflect a balance of engineering and acceptable proven performance.

A number of factors and assumptions were already listed

Now it was clarified that the span calculations used for the values in the code also applied a revised live load reduction factor to account for the lower probability of a full live load in Part 9 buildings

Other Changes



- Width of doorways in bathrooms
 - Improve clarity of requirement and where it applies
- Lintels or arches
 - Now reflects metric equivalents of standard imperial sizes (i.e. 89 mm and not 90 mm)
- Openings in insulating concrete form walls
 - Consistency of requirements

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Width of Doorways in Bathrooms

The 2005 Code wording suggests that doors are required whereas the provisions only specify the size of doors that must be accommodated by doorways, whether or not doors are installed.

The change also recognises that the wider door width , which is also used for barrier-free access, is only necessary for at least one bathroom per floor depending on the facilities provided in the bathroom.

Lintels or Arches

The values for lintels over openings in masonry construction were changed to reflect actual available industry sizes - which are now listed metric values which have been exactly converted from imperial units. The true metric values of 90, 100 and 125 mm were only available overseas.

Openings in Insulating Concrete Form Walls (ICF)

This was an oversight when the requirements for ICF were first introduced. A sentence

that was meant to apply to loadbearing and non-loadbearing walls was only provided in the section for non-loadbearing walls.

This has now been rectified. The requirement reads

“No openings shall occur within 1 200 mm of interior and exterior corners of exterior ***loadbearing*** flat insulating concrete form walls.”

Other Changes



- Starter strips
 - Allow pre-fabricated starter strips
- Exhaust only ventilation systems
 - Deleted ineffective method (drawing all air from bedrooms)
- Location of CO alarms
 - General requirement – follow manufacturers instructions
 - For wood stoves only – manufacturers' instructions or at ceiling
- Ducts for cooking
 - More generic terminology – change from “range-top fan” to “cooking exhaust fan” to cover common appliance types

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Starter Strips

Industry practice of removing tabs from shingles installed as starter strips as well as starter strip products pre-manufactured by the industry do not comply with the current prescriptive requirements but provide acceptable performance.

The Change offers an acceptable solution that is available on the market and provides acceptable performance.

Exhaust Only Ventilation Systems

This change deletes an ineffective method of exhaust-only ventilation, which is based on drawing all its air from bedrooms

However, that air will not be fresh air but mixed house air, which will be of lower quality than fresh outside air and this was not considered to be an acceptable minimum anymore

Location of CO Alarms

The change will address an inconsistency in the Code text. The 2010 Code recognises that the manufacturers set CO detectors at different sensitivities and at different response times based on these sensitivities. The manufacturers are the ones that determine the best location for the installation of CO detectors based on their design criteria.

Only for wood heating appliances and where the manufacturer does not specify a location shall the CO detectors be installed on or near the ceiling

Ducts for Cooking

More generic terminology was introduced in this change that replaces *range-top fans* with cooking appliance exhaust fans

This ensures that all exhaust appliances are captured



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Questions?

Send them to us at codes@nrc-cnrc.gc.ca

Thank you!