



2013 Manitoba Energy Code for Buildings
Domestic Hot Water Seminar
MECB 2013 Implications
May 11th, 2015

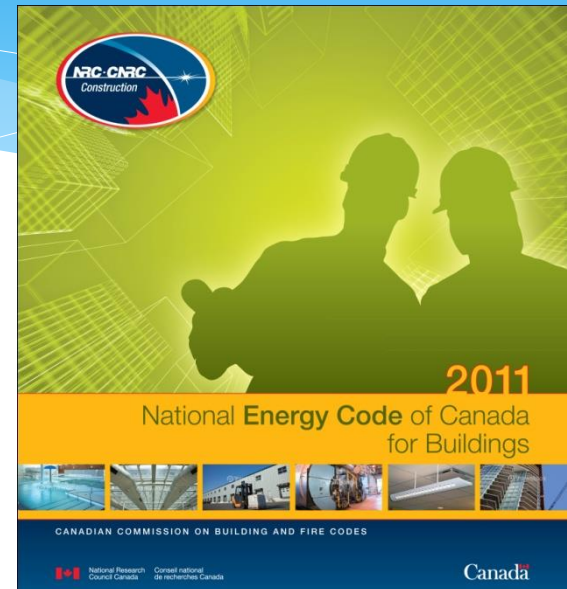
Dieter Bartel
Manitoba Hydro

MECB 2013 Implications Outline

1. Introduction to National Codes
2. Part 6 Service Water Heating Prescriptive Path
3. Part 6 Service Water Heating Trade-off Path
4. Performance Path
5. Energy Efficiency Regulations
6. Compliance and the AHJ
7. Questions

Introduction

- * Model Code developed by Canadian Commission on Building and Fire Codes
- * NECB must be adopted by provincial/territorial authorities to become law
- * MECB 2013 Amendments
- * Errata in 2013



MECB 2013 – Part 6 Implications

* Service Water Heating Systems

“Service water means water for plumbing services, excluding systems exclusively for space heating or cooling or for processes”



MECB 2013 – Part 6 Implications

- * Prescriptive Requirements

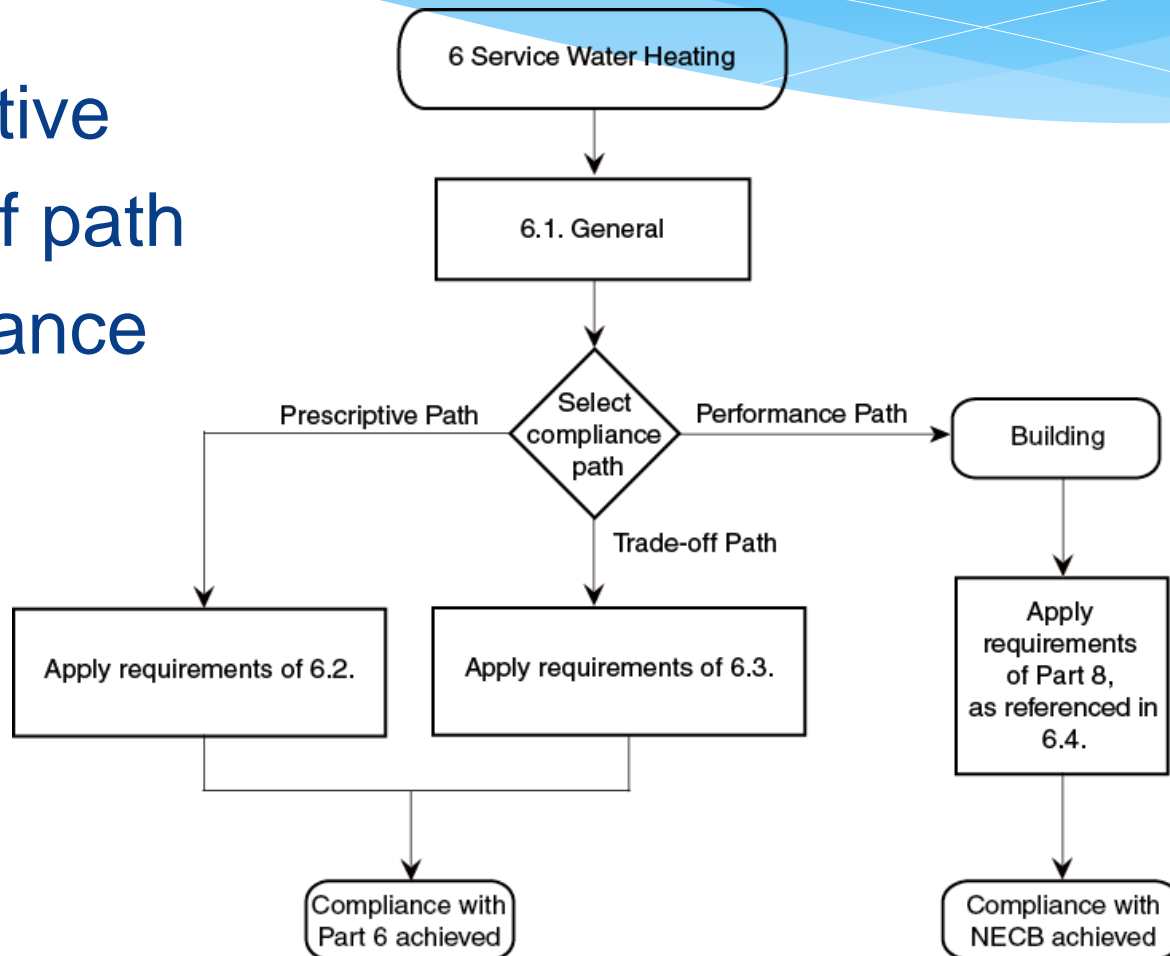
- Heating equipment
- Piping and insulation
- System temperatures
- Hot water discharge flow

- * Trade-off Path

- * Performance

MECB 2013 – Part 6 Implications

- * Prescriptive
- * Trade-off path
- * Performance path



MECB 2013 – Part 6 Implications

- * Prescriptive Requirements

- * 6.2.2.1 Equipment Efficiencies

- * Storage Tank and Instantaneous Appliances

- * Electric, Heat Pump, Gas, Oil

- * Pool Heaters, Gas & Oil

- * Efficiencies requirements are not in isolation from the federal energy efficiency regulations

MECB 2013 – Part 6 Implications

* Equipment Performance Manitoba Amendments

Water Heaters	Input	Performance Requirement
Gas-fired instantaneous	≥ 14.7 kW and ≤ 73.2 kW	$EF \geq 0.8$ CAN/CSA-P.7
Gas-fired storage	≤ 21.98 kW	$EF \geq 0.67 - 0.0005 V$ CAN/CSA-P.3
Gas- Fired storage	> 21.98 kW and ≤ 117 kW	$E_t \geq 80\%$ CAN/CSA 4.3

MECB 2013 – Part 6 Implications

* Prescriptive Requirements

- * 6.2.2.1 Equipment Efficiencies
- * Standby Loss (SL) (CSA C191-04)
- * Thermal Efficiency (E_t) (CSA 4.3-04)
- * Energy Factor (EF) (CSA P.3-04)

MECB 2013 – Part 6 Implications

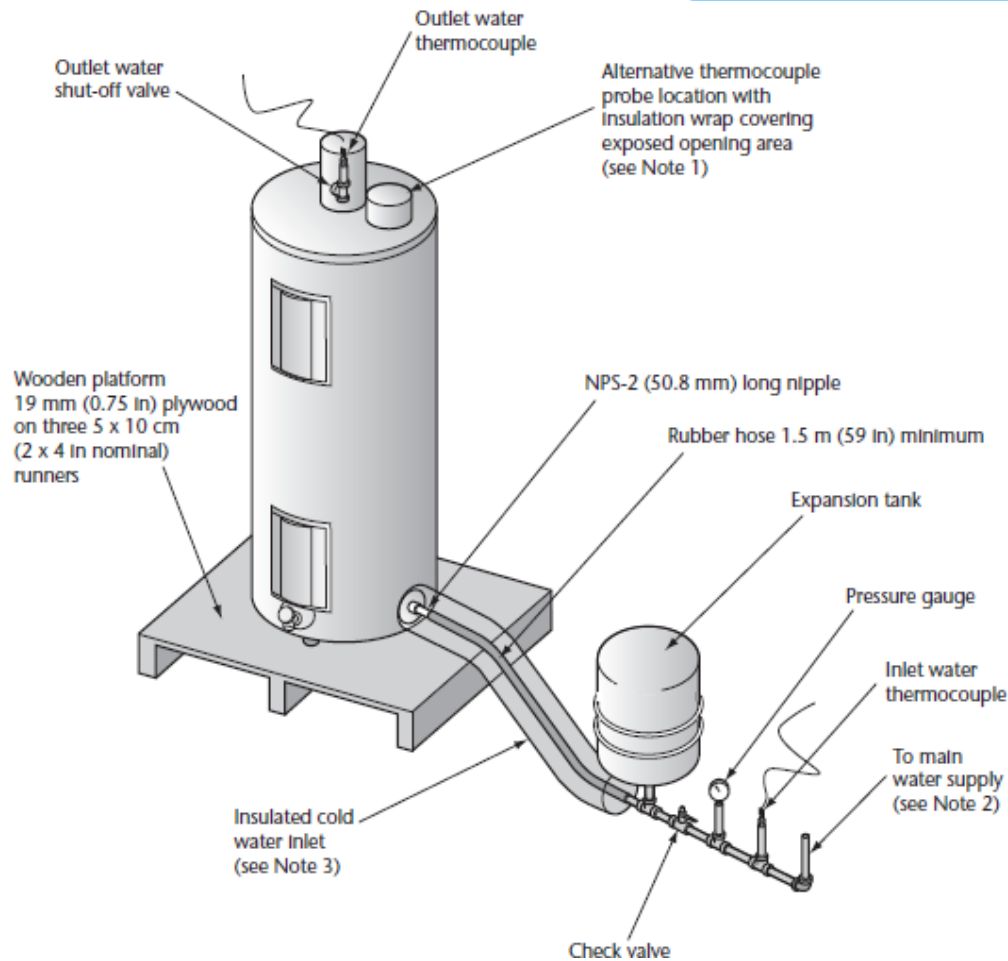
* Prescriptive Requirements (6.2.2.1)

* Standby Loss

- * Actual tank capacity
- * Average water temp at start and end of test
- * Measured energy consumption
- * Temp of tank water and ambient

$$\text{Standby loss, } W = \left[\frac{1.161V_T(T_1 - T_n) + E}{N} \right] \times \left[\frac{44}{(T_T - T_R)} \right]$$

MECB 2013 – Part 6 Implications



MECB 2013 – Part 6 Implications

* Prescriptive Requirements (6.2.2.1)

* Thermal Efficiency

- * Total weight of water heated
- * Average water temp supply (in) and outlet
- * Total gas (heating value) or electricity consumed
- * Re-circulating pump electricity

$$E_t = \frac{KW(\theta_2 - \theta_1)}{(CF \times Q \times H) + E_c} \times 100$$

MECB 2013 – Part 6 Implications

- * Prescriptive Requirements (6.2.2.1)

- * Energy Factor

- * A measure of the overall efficiency of a water heater expressed as the ratio of the energy supplied as hot water to the total energy consumption of the water heater over a 24 hour period

$$E_f = \sum_{i=1}^6 \left(\frac{M_i C_{p,i} (57.2 \text{ }^\circ\text{C} - 14.4 \text{ }^\circ\text{C})}{Q_{dm}} \right)$$

MECB 2013 – Part 6 Implications

- * Prescriptive Requirements
 - * 6.2.2.2 Equipment Insulation
 - * Service water storage tanks
 - * U-value 0.45 W/(m²·K)
 - * U-value 0.08 Btu·ft²·°F

MECB 2013 – Part 6 Implications

- * Prescriptive Requirements

- * 6.2.2.4 Combination SWH and Space-Heating Equipment

- * Where:

- * Input < 22 kW (75 MBH)

- * < twice the SWH load

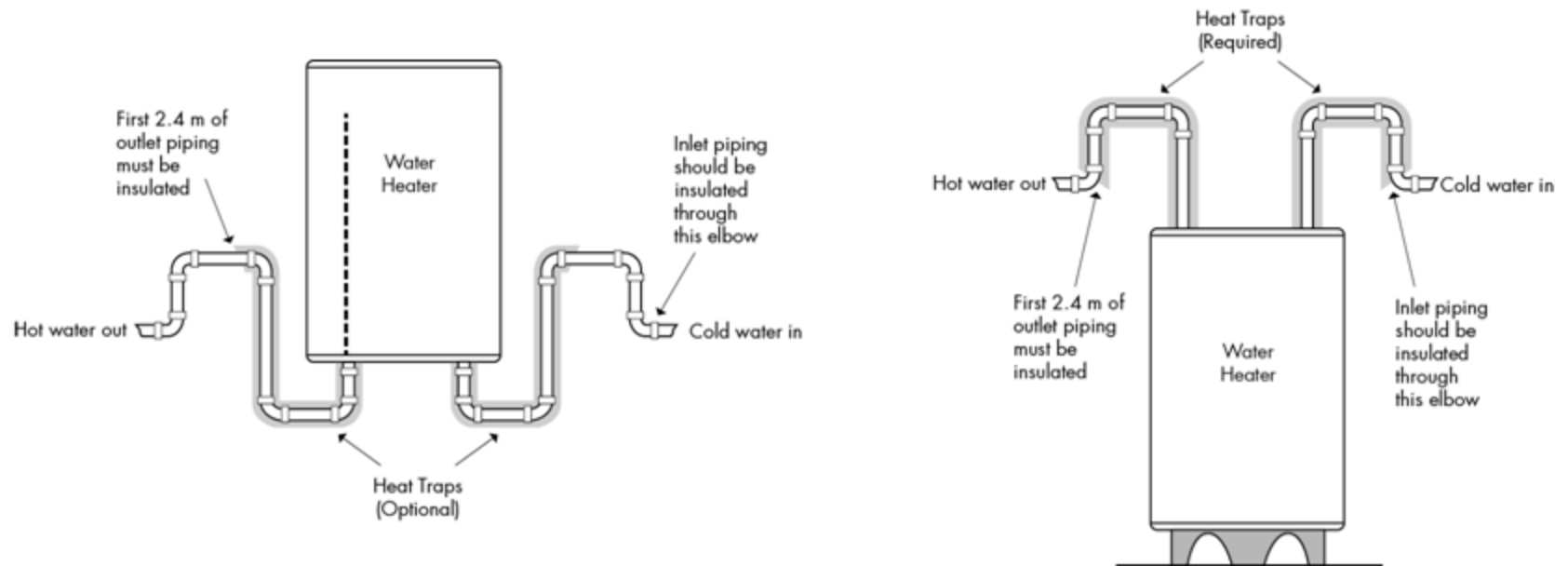
- * Greater of the minimum EE in Tables 5.2.12.1 or 6.2.2.1

MECB 2013 – Part 6 Implications

- * Prescriptive Requirements

- * 6.2.3.1 Table for conductivity of insulation
- * Circulating and non-circulating systems
- * Heat tracing
- * Conditioned or unconditioned spaces
- * Pipe sizes
- * Heat traps

MECB 2013 – Part 6 Implications



Non-circulating systems

MECB 2013 – Part 6 Implications



* Prescriptive Requirements

- * 6.2.5.1 Booster Heaters
- * More than one end use temperature on system
- * Design discharge $> 60^{\circ}\text{C}$
- * $< 50\%$ of design flow
- * Point of Use Option?

MECB 2013 – Part 6 Implications

* Prescriptive Requirements

- * 6.2.6.1 Shower heads 6.6 L/min (1.45 lgal/min)
- * 6.2.6.2 Lavatories 5.7 L/min (1.25 lgal/min) (Auto shutoff)
- * Legislated through Manitoba Plumbing Code in 2011



MECB 2013 – Part 6 Implications

- * Trade-off Path Approach

- * Similar to Part 5 HVAC
- * Spreadsheet tool is available to show trade off compliance to AHJ
- * Fewer components, but a realistic path to provide trade-offs

MECB 2013 – Part 6 Implications

SWH_{TOI}		0.158180
Compliance:		System is NECB Compliant
		<i>SWH Type ID - #1</i>
System Type:		Tank
Equipment Type:		Gas-fired > 117 kW
Tank Volume:	L	60
Component	Units	Component Efficiency
Service water heating equipment efficiency	%	98.0%
Tank insulation value	RSI Value	2.2
Piping insulation value	RSI Value	0.7
Pump motor efficiency	%	80.0%
Pump efficiency	%	60.0%
Heat recovery ratio	W/W	0.0
Average flow of all faucets	L/min	8.3
Average flow of all showers	L/min	9.5
Average flow of other uses	L/min	7.6
Faucet flow ratio	%	50.0%
Shower flow ratio	%	50.0%

MECB 2013 – Part 6 Implications

* 6.4 Performance Path

- * “All in” for Performance Compliance Path, if not complying to the letter on Sub-sections 6.2 or 6.3
- * Need to model proposed building, and potentially reference building
- * CanQuest from NRCan or equivalent software modeling program (test method) adhering to ANSI/ASHRAE Standard 140

MECB 2013 – Part 6 Implications

* Energy Efficiency Act and Regulations

TRADE IN ENERGY-USING PRODUCTS

Interprovincial
trade and
importation

4. (1) No dealer shall, for the purpose of sale or lease, ship an energy-using product from one province to another province, or import an energy-using product into Canada, unless

(a) the product complies with the energy efficiency standard; and

(b) the product or its package is labelled in accordance with the regulations, if any.



MECB 2013 – Part 6 Implications

* EER and Natural Resources Canada

http://www.nrcan.gc.ca/energy/regulations-codes-standards/bulletins/7145#Water_Heaters

9) Water Heaters (Last Bulletin – June 2010)

Based on discussions with stakeholders, NRCan is considering the following approach to standards for water heaters (changes from the last bulletin are in bold and italic>):

Water Heater type and size	Minimum Energy Performance Standards	Schedule	Test method
Gas-fired tankless <250,000 Btu/h	EF reporting only	January 1, 2012	CSA P.7
Gas-fired tankless <250,000 Btu/h	EF = 0.80	January 1, 2016	CSA P.7
Gas-fired tankless >250,000 Btu/h	Thermal Efficiency reporting only	January 1, 2012	CSA 4.3 / ANSI Z21.10.3



MECB 2013 – Part 6 Implications

- * City of Winnipeg Information Bulletin
 - * **2014-014-A/B/E/M/P/S**

DOES THE MECB APPLY TO MY PROJECT?

Within the City of Winnipeg, the MECB applies to PART 3 BUILDINGS with a permit application date on or after December 1, 2014 as follows:

- New Buildings
- Additions
- Initial tenant improvements in a base building subject to the MECB



MECB 2013 – Part 6 Implications

* City of Winnipeg Information Bulletin

MECB Coordinating Registered Professional (CRP) Required

The City of Winnipeg is enforcing the MECB through a Declaration of Professional Responsibility and a Certificate of Compliance from an **MECB Coordinating Registered Professional (CRP)**. The Declaration forms part of the BSDS (Building Site and Design Summary) and IADS (Interior Alterations Design Summary) packages which are already required to be completed for new buildings, additions and initial tenant improvements to Part 3 buildings. The updated [BSDS](#) is now available on the City website while the updated IADS will be available shortly.



MECB 2013 – Part 6 Implications

- * CoW MECB Coordinating Registered Professional
 - * 7 Steps
 - * MECB Declaration of Professional Responsibility
 - * Compliance Checklist
 - * Final MECB Certificate of Compliance

MECB 2013 – Part 6 Implications

* Manitoba OFC

- * http://www.firecomm.gov.mb.ca/docs/ofc_14_006_mecb_feb2015rev.pdf
- * Or <http://www.ashraemanitoba.ca/resources/ggac/>

Adoption of The National Energy Code for Buildings

On December 1, 2014, the 2011 National Energy Code for Buildings becomes effective in Manitoba via provincial Regulation 213/2013 (<http://web2.gov.mb.ca/laws/regs/current/pdf-regs.php?reg=213/2013>.) It will be known as the **Manitoba Energy Code for Buildings** (MECB).



MECB 2013 – Part 6 Implications

* Manitoba OFC

The OFC is enforcing the MECB through a Letter of Assurance and a Letter of Certification from a MECB Coordinating Registered Professional.

A MECB Coordinating Registered Professional must be:

- A registered member of the Manitoba Association of Architects , authorized to practice architecture in the Province of Manitoba; or
- A registered member of the Association of Professional Engineers and Geoscientists of Manitoba (APEGM), authorized to practice engineering in the Province of Manitoba and skilled in the appropriate area of work concerned.



MECB 2013 – Implications

QUESTIONS?

