

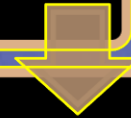


Ontario Building Code HVAC Plans Review

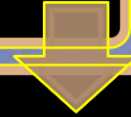
By Dan Q. Xu, P.Eng., C.B.C.O.

Why building code?

Constitution Law



Building Code Act



Building Code



Standards

1983

1986

1990

1997

2006



DRAWINGS
ARCHITECTURAL
ADD.0
ADD.1
ADD.1.1
ADD.1.2
TITLE PAGE/OBC MATRIX
SITE PLAN
MAIN FLOOR PLAN-LARGE
MAIN FLOOR PLAN- REFLECTED CEILING PLAN
MAIN FLOOR PLAN
MAIN FLOOR PLAN-LARGE



CONTENTS

1963



Plans Review

1. Designer's Qualifications
2. Existing or new?
3. Ventilation
4. Mechanical Layout
5. Fire safety
6. Energy efficiency

Designer's Qualification

1. Architect
2. P. Eng
3. Qualified BCIN designer

Occupancy Classification

Group	Division	Description of Major Occupancies
A	1	Assembly occupancies for the performing arts
A	2	Assembly occupancies not elsewhere classified in Group A
A	3	Assembly occupancies of the arena type
A	4	Assembly occupancies in the open air
B	1	Detention occupancies
B	2	Care and treatment occupancies
B	3	Care occupancies
C	---	Residential occupancies
D	---	Business and personal services occupancies
E	---	Mercantile occupancies
F	1	High hazard industrial occupancies
F	2	Medium hazard industrial occupancies
F	3	Low hazard industrial occupancies

Part 3 or Part 9?

PART 3

- Big buildings
- All occupancies
- Architect or P. Eng.

PART 9

- Small building
- Occupancies
C,D,E,F2 and F3
only
- BCIN designer

Code Reference

Div. B 6.2.1.1 Good Engineering Practice to follow
such as:

- a) the ASHRAE Handbooks
- b) the CAN/CSA-F280-M, Residential Space Heating and Cooling
- c) the CAN/CSA-F326-M, Residential Mechanical Ventilation
- d) the NFPA Fire Codes,
- e) the HRAI Digest,
- f) the Hydronics Institute Manuals,
- g) the SMACNA Manuals,
- h) the ACGIH Industrial Ventilation Manual,
- i) CAN/CSA-Z317.2, Care Facilities
- j) the CCBFC, “Model National Energy Code for Buildings”

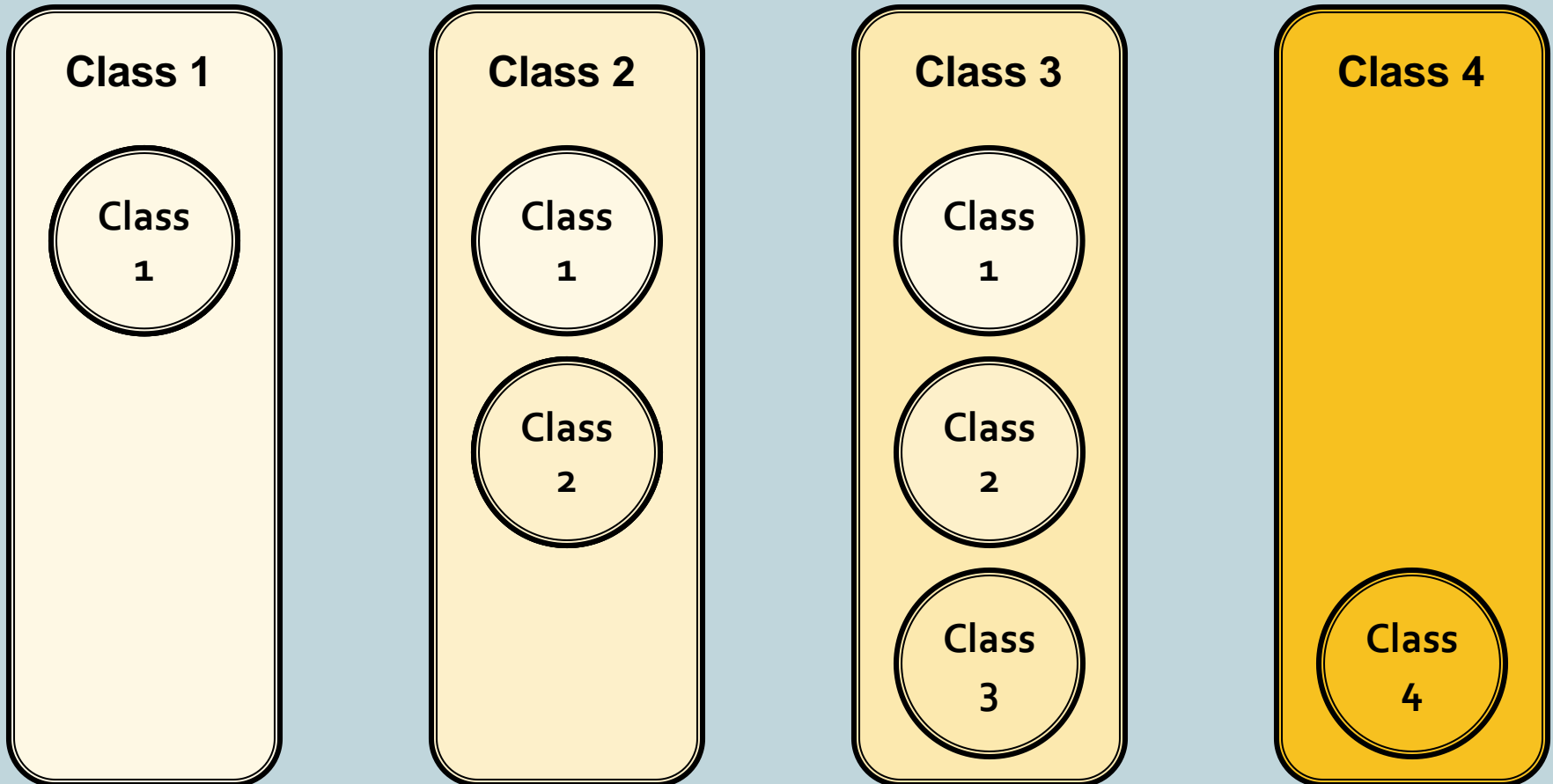
Ventilation

- General
 - ASHRAE 62.1
- Air contamination:
 - ACGIH “Industrial Ventilation Manual”
- Commercial kitchen exhaust
 - NFPA 96
- Mechanical room with refrigeration
 - CSA-B52
- Garage
- Hazardous gases, dusts or liquids

ASHRAE 62.1

- Air classification and contamination control
- Fresh air rate
Table 6-1
- Exhaust rates
Table 6-4
- Clearance
Table 5-1

Air Classification



Garage Ventilation

- Open air or not open air?
- Storage garage:
 - continuous 0.78CFM/sf, or
 - sensor controlled
- Repair garage, 1500CFM per internal bay
 1. Continues, or
 2. Sensor controlled
- Sensor location
 - CO (900 to 1800mm)
 - SO₂ (deepens on application)

Accessory room exhaust to storage garage

- a) accessible only from that *storage garage*,
- b) no openings or duct to other than to *storage garage*, other auxiliary, mechanical or storage rooms,
- c) the exhaust will not affect the air quality in the *storage garage*, and
- d) they are provided with,
 - CO sensor, or
 - a light switch which is interlocked with the exhaust
- e) continues exhaust
- f) equal or exceed the capacity
- g) gas tight smoke/fire damper interlocked with garage exhaust fan

Vestibule and Air Lock

1. Between storage garage and A1 or B occupancy
2. Between storage garage and A2,3,4 or C occupancy when the building is more than 3 storeys height
3. Stair or elevator is provided between storage garage and a occupancy above

Note: ventilation can be natural or mechanical.
Mechanical to be min. $14\text{m}^3/\text{h}/\text{m}^2$ ($0.77\text{cfm}/\text{ft}^2$)

Other Ventilations

- **Kitchen exhaust (NFPA 96-2008)**
 - Separated fire alarm zone is required
 - 5000cfm, multiple speed fan is required
 - No 80% rule of thumb anymore
 - Min 500ft/min
- **Plumbing ventilation (50 cfm/plumbing fixture)**

Mechanical Layout

1. Exit
2. Exit through lobby
3. Public corridor or corridor used by the public
4. Return air paths
5. Air handler serving multiple levels or suites
6. Fire dampers

Exit

1. Permitted openings
 1. Standpipe and sprinkler pipe
 2. Enclosed elect wires/cabled serving only exit
 3. Openings required by 3.2.6
 4. Exit door ways
 5. Protected/ rated gazing or glass block
2. Not fuel fired appliance
3. No potential explosive equipment under the exit space

Outdoor fuel fired appliance

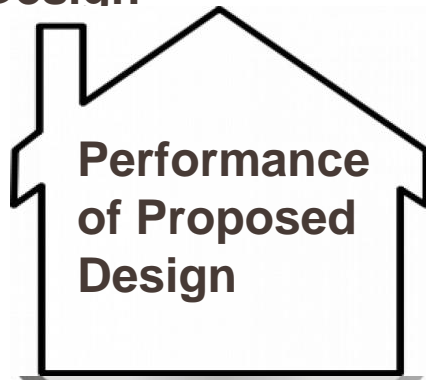
- Min. 1.2 meters clearance to property line
- 3.0 meters to any adjacent wall
- 3 storey above and 5.0 meters horizontally
- Opening must be protected by 45minue FRR closure

Energy Efficiency

- Prescriptive paths
- Performance paths
- Cost budget method
- LEED?

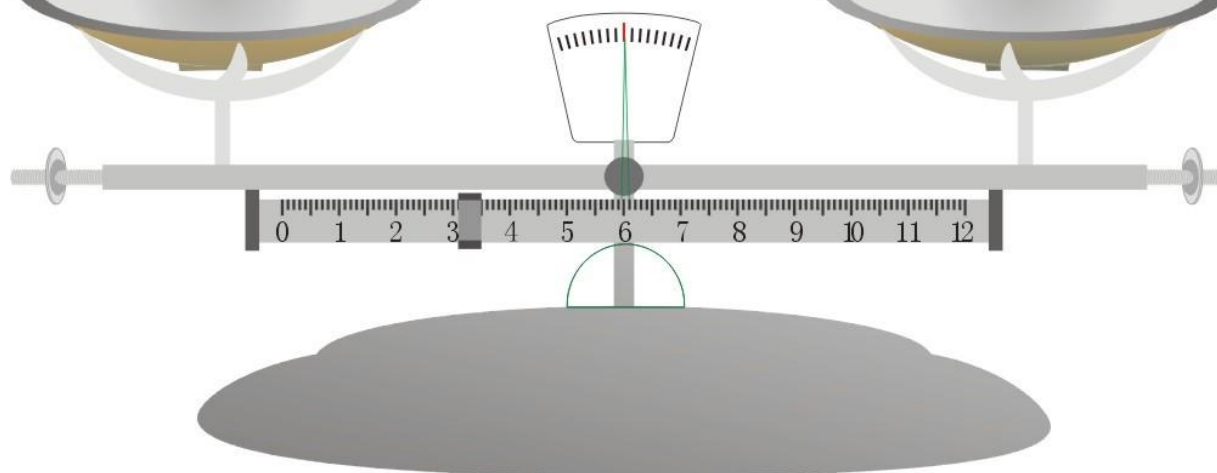
Performance Methods

Annual Energy Use
based on Proposed
Design



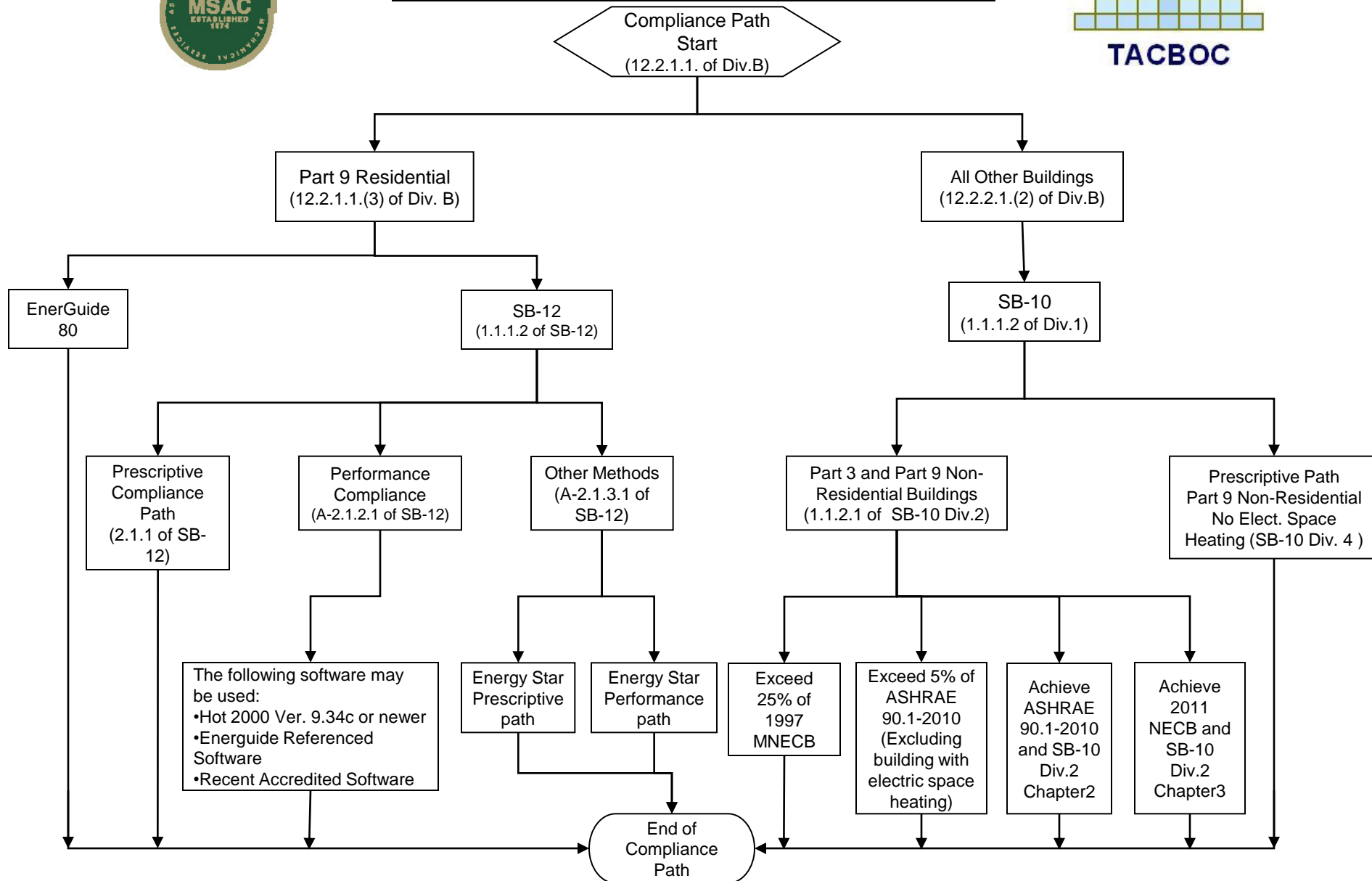
Equal or
Less
Than

Annual Energy Use
based on Prescriptive
Requirements





Energy Efficiency Compliance Paths



Note: This flowchart applies for energy efficiency design before January 2017

Date: June 10,2014

Existing Building

- System performance level after construction shall not be less than prior to construction
- Except F occupancy, ventilation can be natural, mechanical or combined
- Multiple residential suites
 - Smoke alarm in each suite
 - Smoke detector in supply or return air main

New Building Code and Future

- **Fire Safety**

- Fire alarm
- Fire block

- **Objective**

- Electrical grid capacity
- Protecting atmospheric quality
- Protecting water and soil quality

- **Energy efficiency after dec.31 of 2016**

- 15% for part 9 residential
- 13% for other buildings

Dan Xu P. Eng. C.B.C.O.

(905)261-8017

danqingxu2005@yahoo.ca

thebuildings.weebly.com

