

ABC2014:B:9.36. ENERGY EFFICIENCY REQUIREMENT GUIDE

SCOPE OF SECTION 9.36, BY PATH

PRESCRIPTIVE PATH, with or without TRADE-OFF OPTIONS, applies to Part 9 buildings of:

- » Residential (C) occupancy
- » Office, retail and low hazard industrial (D, E, and F3) occupancies with combined total floor area ≤ 300 m² (excluding residential parking garages)
- » Any mix of the above occupancies that results in a Part 9 building of ≤ 600 m² building area and ≤ 3 storeys in building height

PERFORMANCE PATH may be applied ONLY to:

- » Houses with or without a secondary suite, and
- » Part 9 purely residential buildings with common space floor area not exceeding 20% of the total floor area of the building

NEBC 2011

- » may be applied to any Part 9 project, though it is unlikely that a typical house project will benefit from it, and
- » must be applied to D, E or F3 occupancies with combined total floor area > 300 m² (excluding parking garages serving C occupancies), and any other Part 9 building configurations than those listed above, including F2 occupancy.

ADDITIONS AND ALTERATIONS of

conditioned spaces of buildings described above:

9.36 applies to the new construction, and may be applied to existing construction to the extent reasonably practical. For instance, foundation "frostwall" framing removed in a basement redevelopment shall be reconstructed to 9.36 requirements. However, lawfully-existing non-conforming framing that remains unchanged need be insulated and made airtight only to the extent practical.

The guiding principle is that the level of performance of a building shall not be decreased as a result of alterations.

CHOOSING A PATH

PRESCRIPTIVE PATH is the "as specified by Code" acceptable level of building energy efficiency by constructing the minimum requirements for building envelope and mechanical equipment

- » walls/roofs/floors ("opaque" assemblies) (9.36.2.6. and 9.36.2.8.). NEW and increased R values, called Effective Thermal Resistances "ETR"
- » windows/doors/skylights/hatches ("non-opaque" assemblies and doors) (9.36.2.7.) NEW window values, called U-value
- » air barrier sealing all assemblies to reduce energy loss through air leakage (9.36.2.9. and 9.36.2.10.) and
- » heating and domestic water heating appliances of specified minimum efficiency (9.36.3. and 9.36.4.)

TRADE-OFF PATH is the "as specified by Code" with swapping of one or more building envelope thermal performance requirements

to an otherwise PRESCRIPTIVE PATH project, altogether resulting in no worse thermal performance than if the affected assemblies met prescriptive requirements. Trade-offs in 9.36. are restricted to:

- » windows--all on the same side of house (each side calculated separately, to extent of trade-off desired), per 9.36.2.11.(3), (5), (8);
- » opaque above-ground assemblies—between any of floor, walls and roof, etc., per 9.36.2.11.(2), (6), (7).

Highlight the traded sets of assemblies and/or windows clearly on plans, for codes reviews and so that the constructor does not miss any trade-off elements in ordering/installing windows, or in framing and finishing. Trade-off calculations—derived manually, or by use of calculator at this [link](#) and must be attached to the application.

PERFORMANCE PATH compares the energy performance of a proposed house or small residential building (only) to that of a reference house or building, i.e., one that follows the prescriptive path as described above. Performance losses in one building parameter are allowed to be offset by performance gains in another, altogether designed so that the annual energy consumption of the proposed house or residential building does not exceed that of the reference house or residential building.

A pre-build energy model Performance Report shall be submitted with this application, documenting the proposed construction contrasted with the reference, and a mandatory Edmonton Summary containing information listed in

ABC2014:C:2.2.8. An ASHRAE 140-compliant computer modeling software program is to be used; HOT 2000 is common. Energuide Rating System reports alone do not demonstrate 9.36 compliance.

When proposed air-change is less than the prescriptive value (2.5 ACH with 9.25 and 9.36 air barrier details completed; 3.2ACH with 9.25 details only), a blower door test report must be submitted, confirming that the proposed air-change rate was achieved in the actual construction.

DRAWINGS, SECTIONS AND DETAILS SUBMISSION REQUIREMENTS

- » Call out floor, wall and roof assemblies on the building floor plans and elevations, to relate to the corresponding assembly details
- » Provide fully-labeled sections of all assemblies forming floors, walls, roofs both above ground AND below grade/ in-ground-contact. Show effective thermal resistance (ETR) calculations, in Metric RSI (plus Imperial R, if desired for trades; $RSI \times 5.678 = \text{Imperial R}$)
- » Show all thermal insulation and vapour barrier details, as well as air barrier continuity/seal according to the option chosen in 9.36.2.9.(1) indicating that air leakage shall be controlled by establishing a continuous air barrier system in accordance with 9.25.3. + 9.36.2.9.(2)-(6),
 - AND—
 - in accordance with 9.36.2.10 details — thus satisfying PRESCRIPTIVE PATH air barrier requirements
 - OR—
 - Type A4 air barrier system tested to CAN/ULC-S742 —OR— (c) air barrier system tested to ASTM E2357 to not exceed $0.20L/(s \cdot m^2)$ leakage

MOST COMMON DETAILS FOR AIRTIGHTNESS AND INSULATION

AIR BARRIER CONSTRUCTION AT...

Flexible sheet air barrier

(exterior tyvek, etc or most typically interior poly combined Air/Vapour barrier: 9.25.3.3.(2) / 9.36.2.10.(5),(6)

Rigid panel air barrier

9.25.3.3.(1) / 9.36.2.10.(3),(6)

Typical outlet box interrupting the plane of airtightness, at wall, ceiling or floor 9.25.3.3.(6) / 9.36.2.10.(5),(7)

Windows and doors 9.7.6.1. / 9.36.2.10.(9)

Rim/floor assembly at foundation wall, upper levels, cantilevers: seal all joints/junctions or wrap 9.25.3.3. / 9.36.2.10.(8),(10)

Partition or party wall/envelope interface

9.36.2.5.(2) / 9.25.3.3.(3),(4),(5) / 9.36.2.10.(11),(16)

Duct/chimney/plumbing stack pipe penetrating envelope

9.25.3.3.(8) / 9.36.2.10.(12)-(15)

Floor on ground for soil gas protection

(radon, etc) 9.36.2.8.(10) / 9.25.3.6. / 9.36.2.10.(6)

Note how every **9.36.2.10 airtightness** Sentence has a related, less-stringent 9.25.3 air barrier rule that always applies.

INSULATION CONTINUITY AND VALUES FOR....

Planes of insulation that are separated 9.36.2.5.(5)

Walls with pipes, ducts, conduits, cabinets, chases, panels, etc in/parallel: maintain wall ETR 9.36.2.5.(6)

Floors or Ceilings with ducts, pipes, conduits within the plane of insulation: maintain min ETR 2.78--R16 9.36.2.5.(7)

Rim joist at foundation wall, upper levels, cantilevers, skylight shafts no less than required for above-ground walls 9.36.2.6.(2)

Roof truss heel/eave no less than nominal RSI3.52--R20 for max 1.2m from exterior wall plane 9.36.2.6.(3)

Access/attic hatch no less than nominal RSI2.6 --R15 and weatherstrip 9.25.3.3.(7) / 9.36.2.7.(8)

Unheated floor—on-ground above 1.2m frost line (walkout or shallow basement) 9.36.2.8.(4)

Heated floor—on-ground (heat pipe, heat cable or heat membrane within floor) 9.36.2.8.(5),(6),(7)

Ducts (except exhaust ducts) outside plane of insulation: maintain above-ground wall ETR 9.36.3.2.(3)

Rectangular duct insulation adjustment where under a floor over unconditioned space 9.36.3.2.(5)

Damper types/location 9.36.3.3.

Water line insulation type/location 9.36.4.4.

TRADE-OFF PATH must have all the above, and trade-off calculations attached to the application. Highlight trade-offs on the drawings.

PERFORMANCE PATH has the above applicable air barrier details if proposed 2.5ACH; however 9.36.2.10 air barrier details are optional for proposed 3.2 ACH;

BLOWER DOOR TEST (BDT) report submission prior to occupancy is obligatory if proposed < 2.5 ACH —OR— if builder indicates it will be submitted for a 2.5 ACH Performance Path project.

ENSURE THE FOLLOWING IS ALSO INCLUDED WITH APPLICATION:

ABC2014:C:2.2.8.2

Drawings, Specifications and Calculations for Energy Performance Compliance

ABC2014:C:2.2.8.3.

House Performance Compliance Calculation Report

- » project address; description; a unique identifier to link Report to the drawings, details, documents, etc. that pertain to the project
- » geographic region of project; for the climatic data set used for analysis; name and version of the calculation tool
- » Edmonton Summary of building envelope, HVAC system and DHW system reflecting information provided in 2.2.8.2., above
- » energy performance data summary of the annual energy consumption of all energy sources calculated for the proposed house, contrasted with the house energy target of all energy sources calculated for the reference house; software program name(s), with list of user adaptations to the software relating to input/output values if program is used to determine compliance; statement by person responsible for report preparation that the calculation was performed in compliance with ABC2014:B:9.36.5.

COMPLETING THE ABC2014:B:9.36 ENERGY EFFICIENCY APPLICATION CHECKLIST

Complete the following page for a manual (paper) application. [Online application is currently available for Single Dwelling House Combo Permit.

1. Confirm roofs/walls/floors effective thermal resistance ("ETR"; metric units RSI) for Edmonton/Zone 7A. [9.36.2.7.] Table selection is based on whether an HRV is to be installed or not: (1)A is for **WITHOUT HRV** and (1)B is for **WITH HRV**. The Assembly Detail column is for a brief description of the building assembly structure and insulation to be installed, for purposes of crosscheck with plans and for inspection. Some examples are: 2x6@24oc/R22 batt; attic truss 24oc/16"cellulofibre; 2.5"XPS ext fdn wall to footing; 8" low density spray foam; and so on. The drawings will contain the complete listing, including location and type of air barrier and vapour barrier.
2. Values shown are minimum performance levels required for Edmonton/Zone 7A. Window and door performance is listed in "U"-value which represents overall thermal transmittance, the inverse of effective thermal resistance "ETR". $1/U = ETR$; $1/ETR = U$
- 3 & 4. Common appliances are listed. If selecting others, see 9.36.3.10. or 9.36.4.2. Confirm only; do not include manufacturer's specs.
5. Confirm, as applicable, that the requirements will be met in the project.

For More Information

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The logo for the City of Edmonton, featuring the word "Edmonton" in a white, sans-serif font on a dark blue rectangular background.