

## Questions and Answers

### Builder Forum Series: Airtightness Techniques and Heat Pump Best Practices (Nov. 19, 2020)

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#### *Airtightness*

As we increase airtightness of our homes, how will that interact with 700 cfm hood fan in spice kitchen? Where will that air come from?

**Einar Halbig, E3 EcoGroup:**

Excellent point- time to think about the relatively high cfm capacities of typical hood fans, and at some point a make up air system will be wise- if not required particularly in soil gas areas.

Regarding line set wall penetrations, how much of a concern are they regarding blower door tests?

**Einar Halbig, E3 EcoGroup:**

Relatively minor concern if just one; if a split heat pump system with multiple linesets entering the building then more of a concern. They, like all other penetrations through the air barrier system, should be properly detailed in the drawings, and sealed properly by trained people

I think trades knowledge is lacking on what an air barrier even is. You are either asking your sider or insulator to make an air-tight barrier and they are not even sure why they are putting the poly on or the house wrap up.

**Einar Halbig, E3 EcoGroup:**

Yes agreed- we should not assume everyone, including Tradespeople, know what an air barrier is and how they can impact the effectiveness of such. Trades seem to be the “missing link” to improving airtightness until some training/help/education becomes available to them.

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#### *Heat Pump Best Practices*

Can you couple a hot water tank to the ashp (air source heat pump) or wshp (water source heat pump) and create a hybrid?

**Mikhael Horvath, Enforma Engineering Inc.:**

There are several ways to use heat pumps for hot water heating:

- Air-to-water air source heat pump
  - In this way the heat is conveyed first to a hydronic heating circuit, which can then be used to transfer heat to any number of places, including domestic water via either indirect-fired tank (tank with a hydronic heating coil inside) or via external heat exchanger
- Desuperheater used in conjunction with Air-to-Air or Water-to-Air heat pump:

- The addition of a desuperheater entails the modification an OEM heat pump refrigerant circuit, previously intended only to deliver heat to an air stream, so that it can *also* deliver heat to a fluid via refrigerant-to-liquid heat exchanger
  - Most prevalent application is to heat domestic hot water, though heat could be used for a hydronic circuits also (ex. in-floor)
- Example: <https://www.nordicghp.com/product/nordic-products/external-desuperheater/>
- Dedicated hot water heater heat pumps, as identified in the presentation. These come in two configurations:
  - Split-type: ex. Sanden units - condensing unit is outside - higher efficiency, wider operating range than integral type
  - Integral (integral heat pump sits on top of tank): ex. Rheem units
    - Unducted - not recommended for cold climates (aka all of Canada), affects space temperature where tank is located
    - Ducted - air from which heat is to be extracted is ducted from outside to the unit and then back to the outside so as not to affect space temperature of where unit is located

This technology has been available in Canada since 2004. Unfortunately it hasn't been accepted by BC Hydro until recently as an acceptable solution for water heating.

**Mikhael Horvath, Enforma Engineering Inc.:**

Yes, heat pump technology has come a long way in the last 15 years. And if Industry is prudent in its expansion of their use they will gain the trustworthiness they deserve.

Is it true that with a heat pump that my Hydro will always be in level 2?

**Einar Halbig, E3 EcoGroup:**

I suppose that last question about “will my Hydro always be in Level 2” refers to the Tier 2 Hydro rate, which I would certainly expect a homeowner to be in when space heating with any electric appliance.

**Mikhael Horvath, Enforma Engineering Inc.:**

Now I see what was meant: <https://app.bchydro.com/accounts-billing/rates-energy-use/electricity-rates/residential-rates.html> I would agree. Even the target MEUIs for Step 3 and Step 4, across the range of conditioned floor area, alone would exceed the two-month 1350 kWh threshold (not including appliances, etc.). That said, it is a ratchet, meaning the first 1350 kWh are billed at the lower rate.

**Kevin Ramlu, Building Energy Manager at Township of Langley:**

The BC Hydro rate structure for residential accounts can be found here:

<https://app.bchydro.com/accounts-billing/rates-energy-use/electricity-rates/residential-rates.html>

If you are using a heat pump, during the heating season, you may be into Step 2; however, as this is a tiered rate structure, the first 1350kWh are billed at the Step 1 rate.