**NEHERS ASHP Field Study Resources**

Mike Duclos – 1/9/2019

Mike is available for consultation on a wide variety of ASHP related questions, issues and resolution of issues related to installations, etc. [mike@eeassociates.com](mailto:mike@eeassociates.com) 978-793-3189

**Passive House ‘free stuff’**

For those interested in learning a bit more about Passive House, Mike has two free ‘teaser’ videos on Windows and Floor planning for Passive House available at:

<https://www.heatspring.com/courses/all-about-windows>

<https://www.heatspring.com/courses/passive-vs-conventional-floor-planning-passive-house-sample-design>

If you are interested in receiving the terse Passive House Mass. monthly newsletter here is the link - you can easily unsubscribe at any time:

<https://phmass.org/join-now/>

**Links to the four field Studies Rob Aldrich presented at the PHIUS NA PH Conference Boston, September 2018**

**1. Field Performance of Inverter-Driven Heat Pumps in Cold Climates** – Williamson / Aldrich

<http://vermontfuel.com/heatpump/ewExternalFiles/DOE_inverter-driven-heat-pumps-cold_2015.pdf>

**2. Ductless Mini-Split Heat Pump Impact Evaluation- Cadmus for MassSave**

<http://ma-eeac.org/wordpress/wp-content/uploads/Ductless-Mini-Split-Heat-Pump-Impact-Evaluation.pdf>

**3. Field Evaluation of Advances in Energy Efficiency Practices for Manufactured Homes – Levy et al.**

<https://static1.squarespace.com/static/5a5518914c0dbf4226cd5a8e/t/5ab3fcebaa4a99cf008c7503/1521745134371/65436.pdf>

**4. Evaluation of Cold Climate Heat Pumps in Vermont – Cadmus**

<https://publicservice.vermont.gov/sites/dps/files/documents/Energy_Efficiency/Reports/Evaluation%20of%20Cold%20Climate%20Heat%20Pumps%20in%20Vermont.pdf>

**Northeast Energy Efficiency Partnership - NEEP website:**

‘State of the art’ information on extended temperature performance, sizing and installation guidelines, in both video and written form – see links below

[**https://neep.org**](https://neep.org)

**NEEP Installer Resources webpage – with the following key resources:**

[**http://dww.neep.org/air-source-heat-pump-installer-resources**](http://dww.neep.org/air-source-heat-pump-installer-resources)

**Two Installers Videos**

**#1 – Installation -** 6 minute – Covers location of indoor unit, management of snow and bulk water, flaring, leak test, triple dry nitrogen purge (I’m told this can be done in 30 min with practice and is very important to long outdoor unit life) air sealing and ‘critter proofing’ lineset penetrations, condensate management, use of wall mounted vs handheld controls, owner education of controls, filters, backup heat management, owners manual, maintenance, etc.

**#2 – Sizing and Selecting** – 6 minute – Best practices for design and sizing, discussion of strategies to address existing homes, use of existing ducts, compact ducted uint to serve a small group of rooms, multizone limted to 2-3 zone maximum, oversizing particularly bad for multizone, smallest indoor unit no smaller than 1/3 of outdoor unit capacity, oversizing is worse for low load buildings, do load calculations,

**Two written Guidelines:**

**1. Guide to Sizing and Selecting ASHP in Cold Climates** – Excellent overview of ASHP design considerations, with four one page application scenarios with suggested strategies, and a number of general guidelines to facilitate better system operation.

**2. Guide to Installing ASHP in Cold Climates – E**xcellent overview of the key installation criteria, best practices, etc.

**Cold Climate ASHP Specification Spreadsheet**

Provides extended temperature data, other important design information

Go to this website and enter your name and email address:

<http://dww.neep.org/ccashp-product-listing-download>

**David Lis / Bruce Harley NEEP ASHP Webinar** – 1 hourSee NEEP Webinar Presentation – Sizing Selecting Installing ASHP in Cold Climates

An overview the NEEP ASHP initiative by David, followed by an overview of the guides above with some salient observations by Bruce.

**Some webinar notes**

Manual S allows you to use 130% of the lowest speed of the variable speed for the upper limit of cooling capacity, not the highest speed.

Northwest Alliance and Efficiency Maine Guidelines (particularly eave drip and snow, without use of pan heaters) had valuable recommendations.

Surge suppressors are not expensive to add.

**Webinar Q&A – Mikes Notes**

Duct losses in mini-duct systems in unconditioned space – avoid where possible, pay close attention to duct losses if this is not possible.

Generally continuous operation at lower speeds is more efficient than operation at high speed.

No guidance on the use of transfer fans, PG&E has done some work, transfer fans are not all that effective, but can work well enough for some.

Defrost energy use is greater in the range of 25F to 35F with high humidity / rain / snow but generally defrost is not an issue at design conditions. Very cold air can hold little moisture.

Not many mini-duct systems meeting NEEP cold climate spec, but consider trade-offs with delivered performance due to better modulation time over the year, a non-NEEP rated machine may work well in some contexts.

**Wall Mount ASHP Vibration Isolation Experiment**

This is provided as a separate document, illustrated with images.