

NYSERDA

Sizing and Design Tools and Considerations

Training Topics

- Oversizing
- Over-zoning
- Existing Duct Management
- NEEP Sizing and Design Selection Tool – Live Demonstration

Sizing Considerations




*Oversizing, Over-Zoning, Existing Ducts,
Supplemental Heating*



NYSERDA

Oversizing

The Basics

-  Always specify Air conditioning, Heating & Refrigeration Institute (AHRI) indoor/outdoor matched pairs
-  Pull extended performance data from NEEP database or manufacturer's data
-  Size for heating first, cooling second

What Really Matters When Sizing For Heating

- Meeting home heating load on the coldest day
- Not providing too much heat on mild days
- Ensuring heat in every room by choosing the right product.

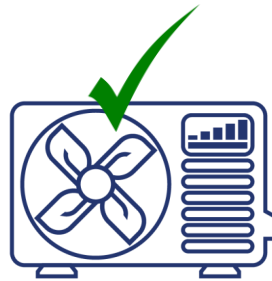
The Goldilocks Principle



Too Small

System will not keep the house warm on the coldest days

- Poor comfort (cold and may need backup heat)
- Slow catch up if using thermostat setbacks



Just Right

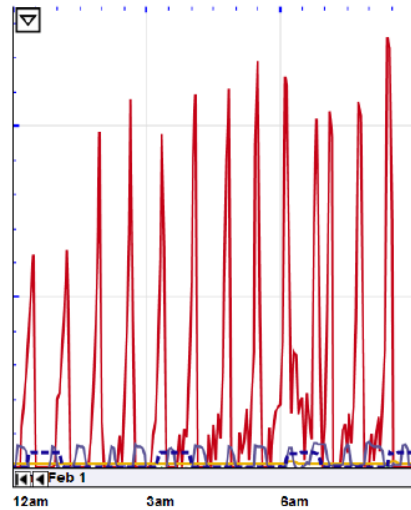
- Comfortable
- Efficient
- Durable



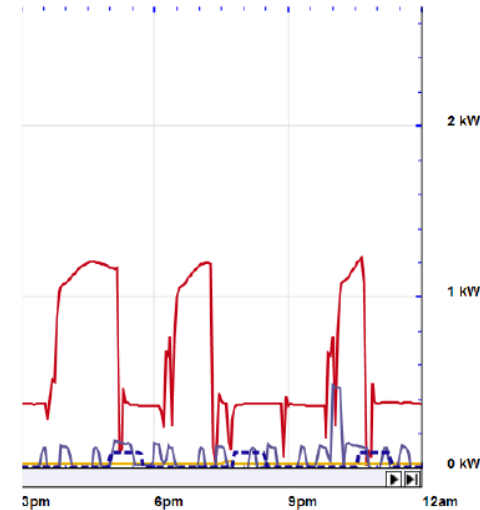
Too Big

- System will cycle on and off
- Poor comfort (humid and too warm)
- Poor energy efficiency
- Poor durability
- More expensive

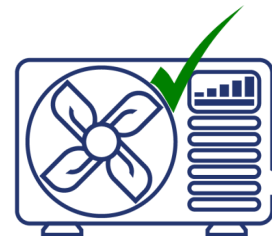
Too Much Heat Leads to Short Cycling



Short cycling: turns on and off repeatedly



Right-sized: runs for 20 min. to 2 hour blocks steadily



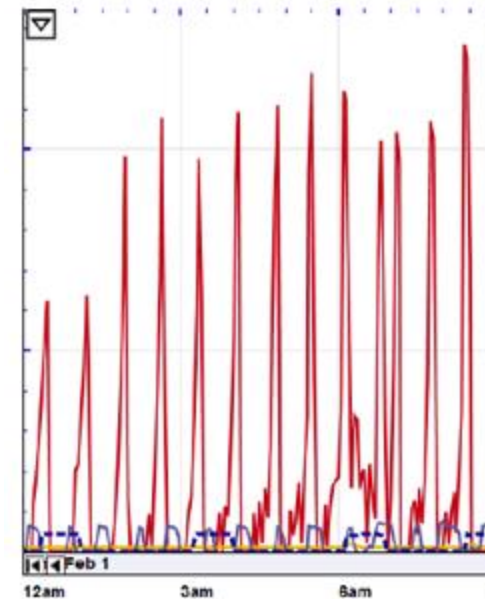
The Effects of Oversizing

- How Oversized *is* Oversized?
- Operational Issues
 - Low-Load Compressor Cycling
 - Lack of Dehumidification
 - Purge Cycling
 - Poor Comfort
- Cost Issues
 - Upfront Cost
 - Energy Usage, Inefficiency, and High Bills
 - Shorter Equipment Lifespan

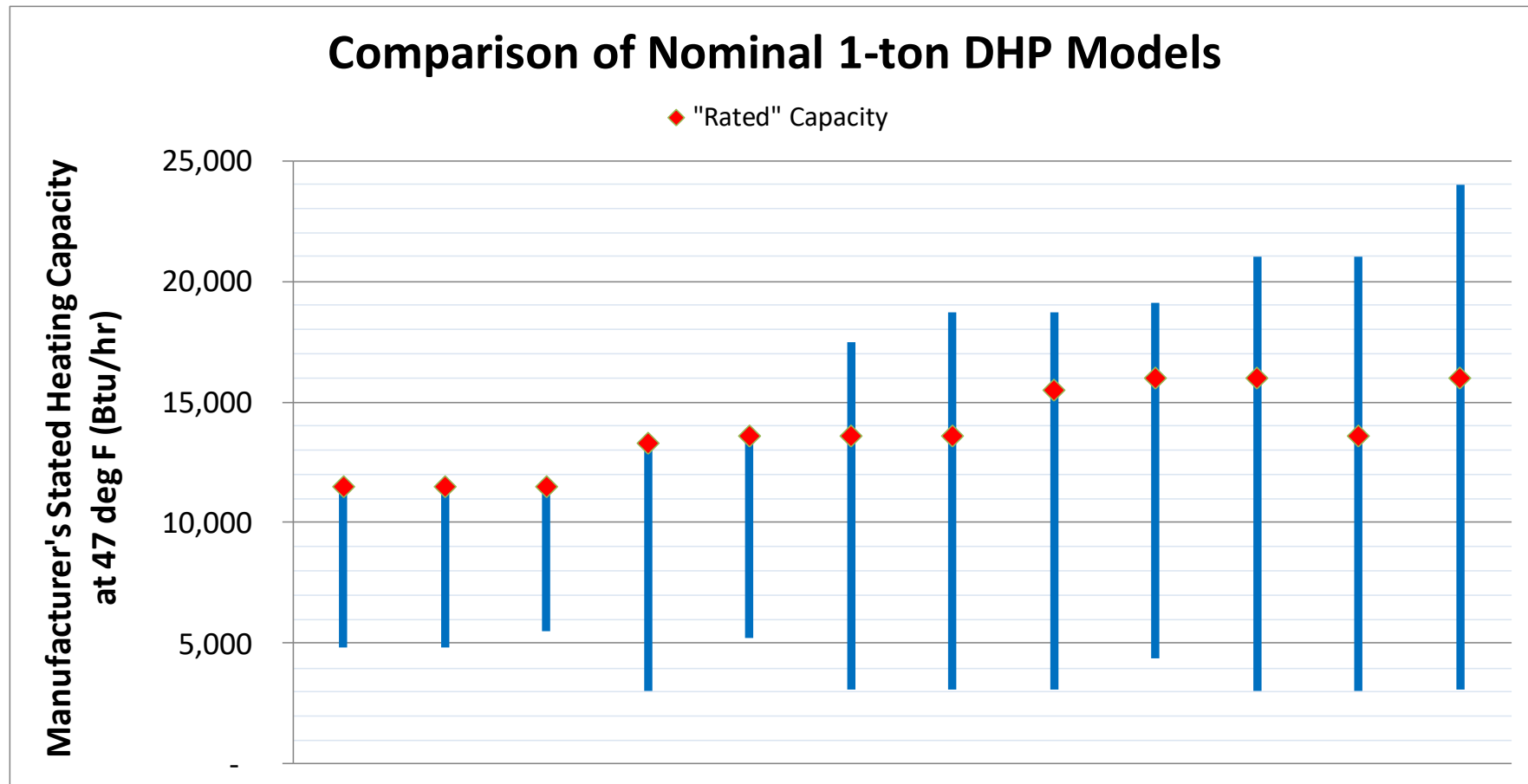


Importance of Avoiding Short Cycling

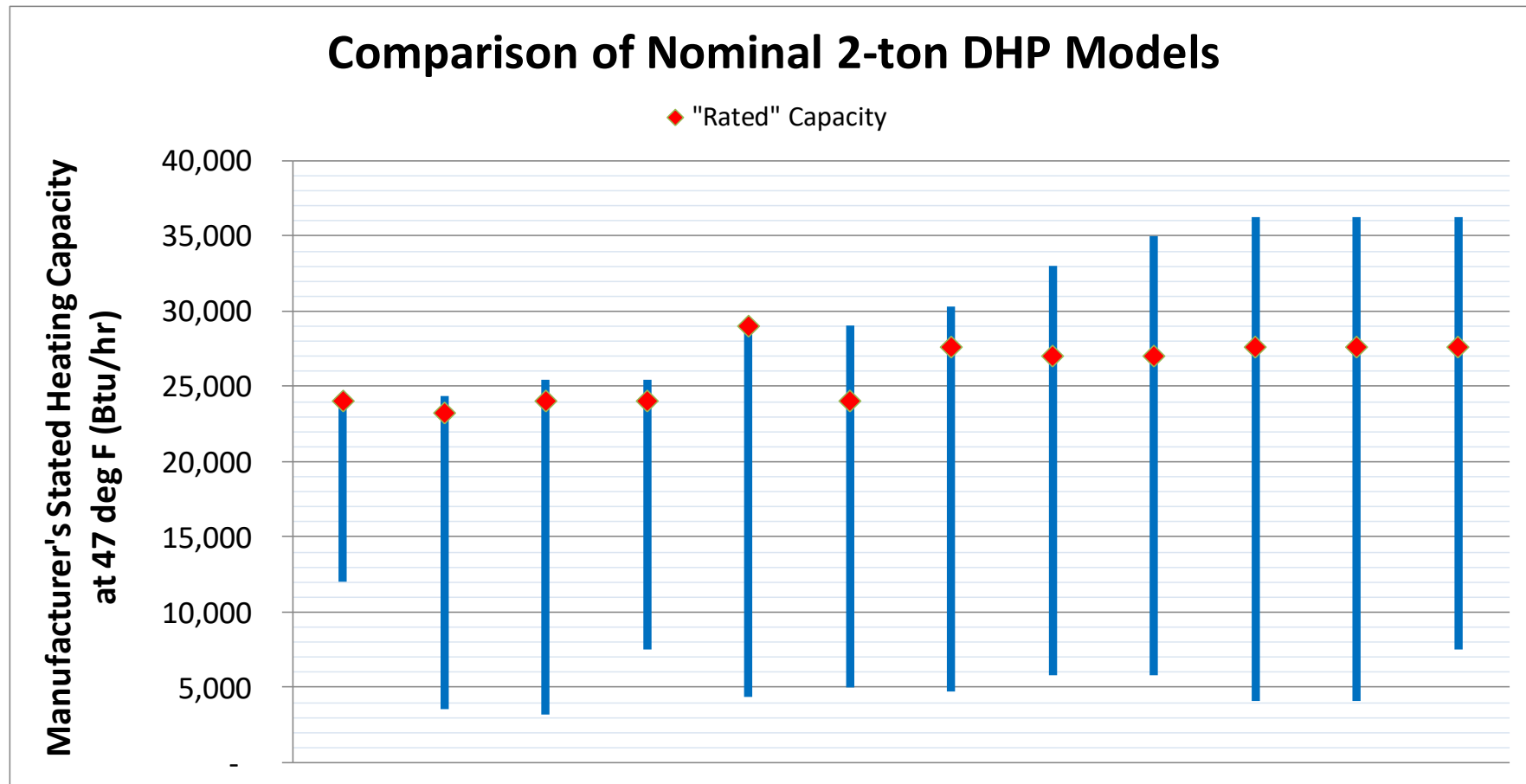
- Short Cycling Can:
 - Reduce operating COP by 15% – 40% when short cycling
 - e.g., a COP of 5.0 acts like a 4.0
- Not as critical as failing to meet design load, ***but the impact should not be neglected***,
 - For partial load displacement - it is the **more critical** sizing factor



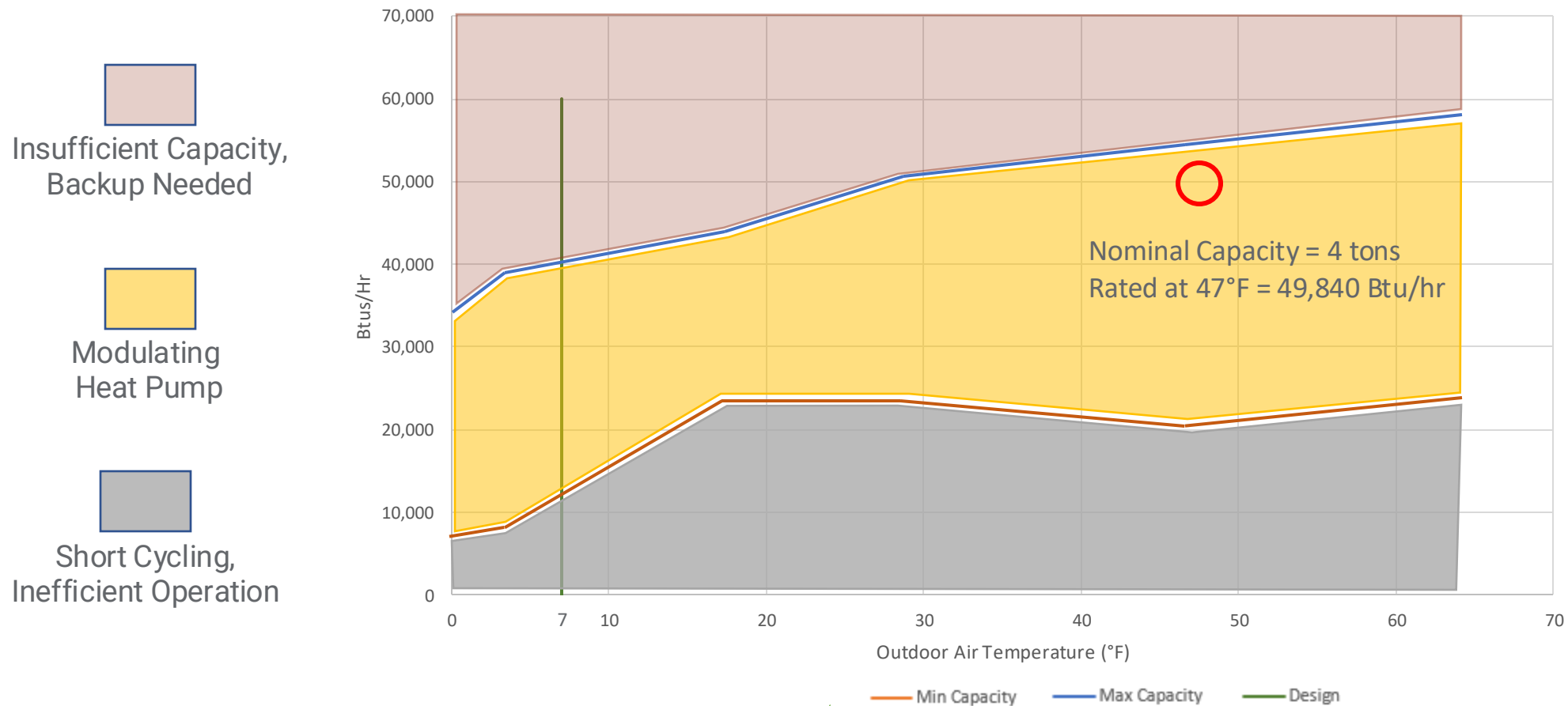
Maximum-Minimum Capacity Ranges



Maximum-Minimum Capacity Ranges

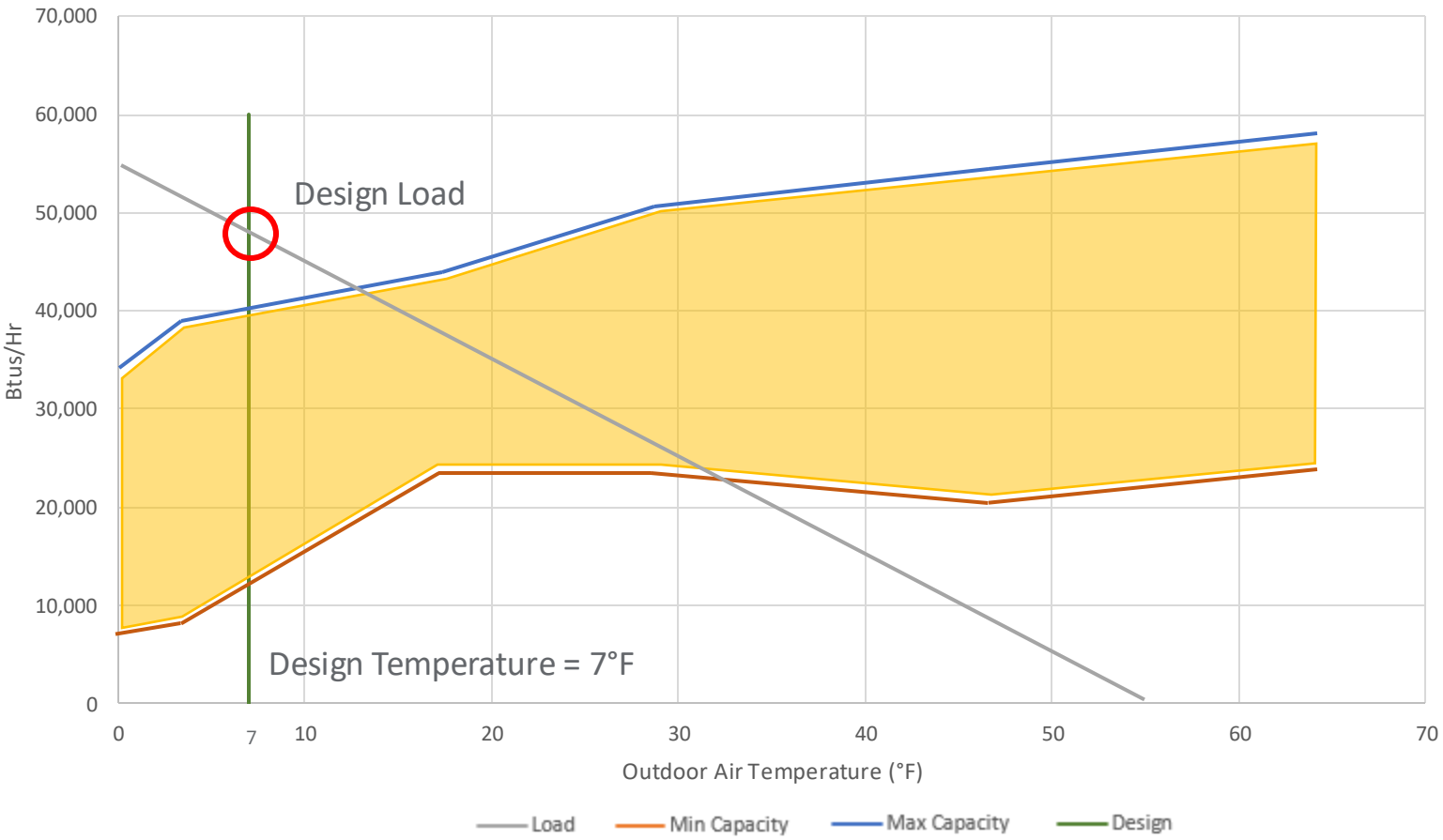


VCHP Modulating Zone

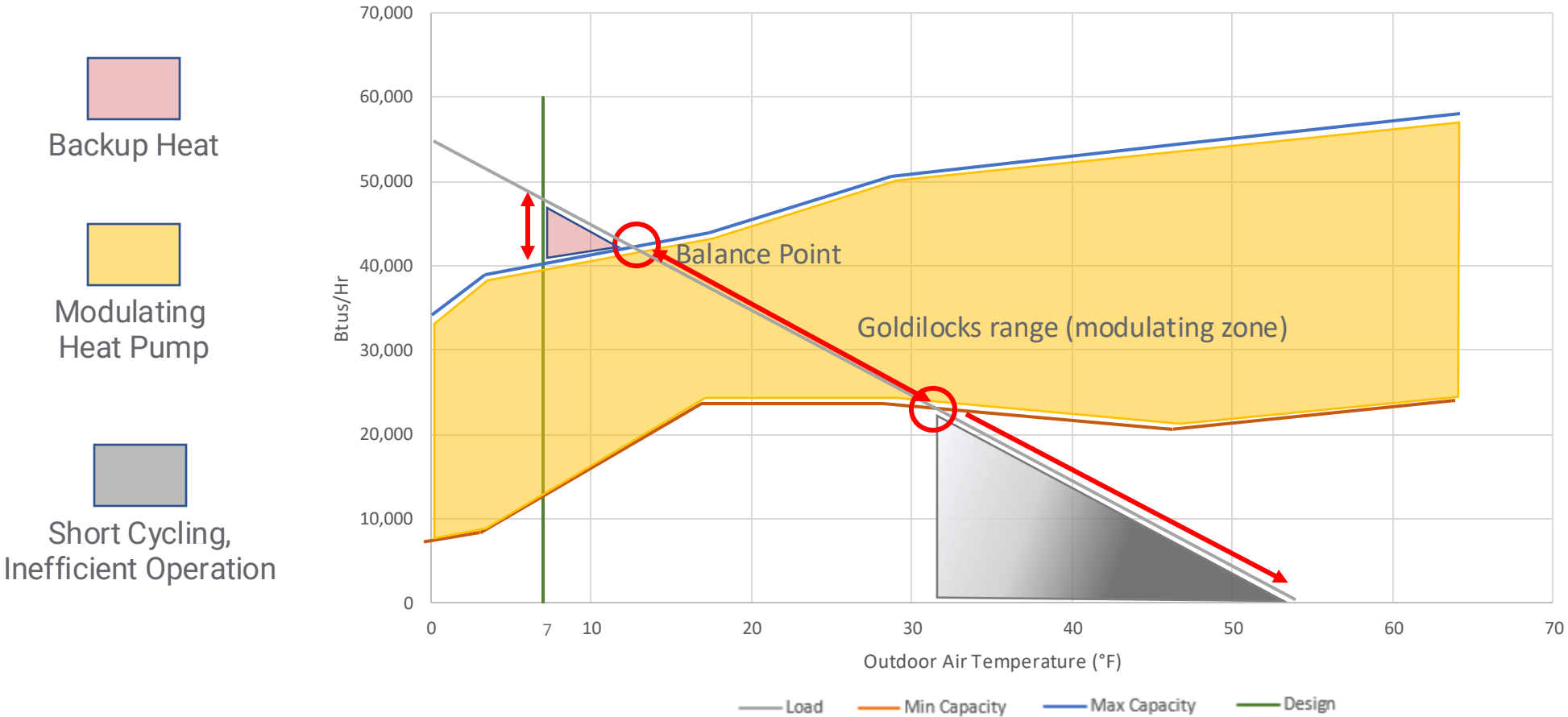


Home Load Line

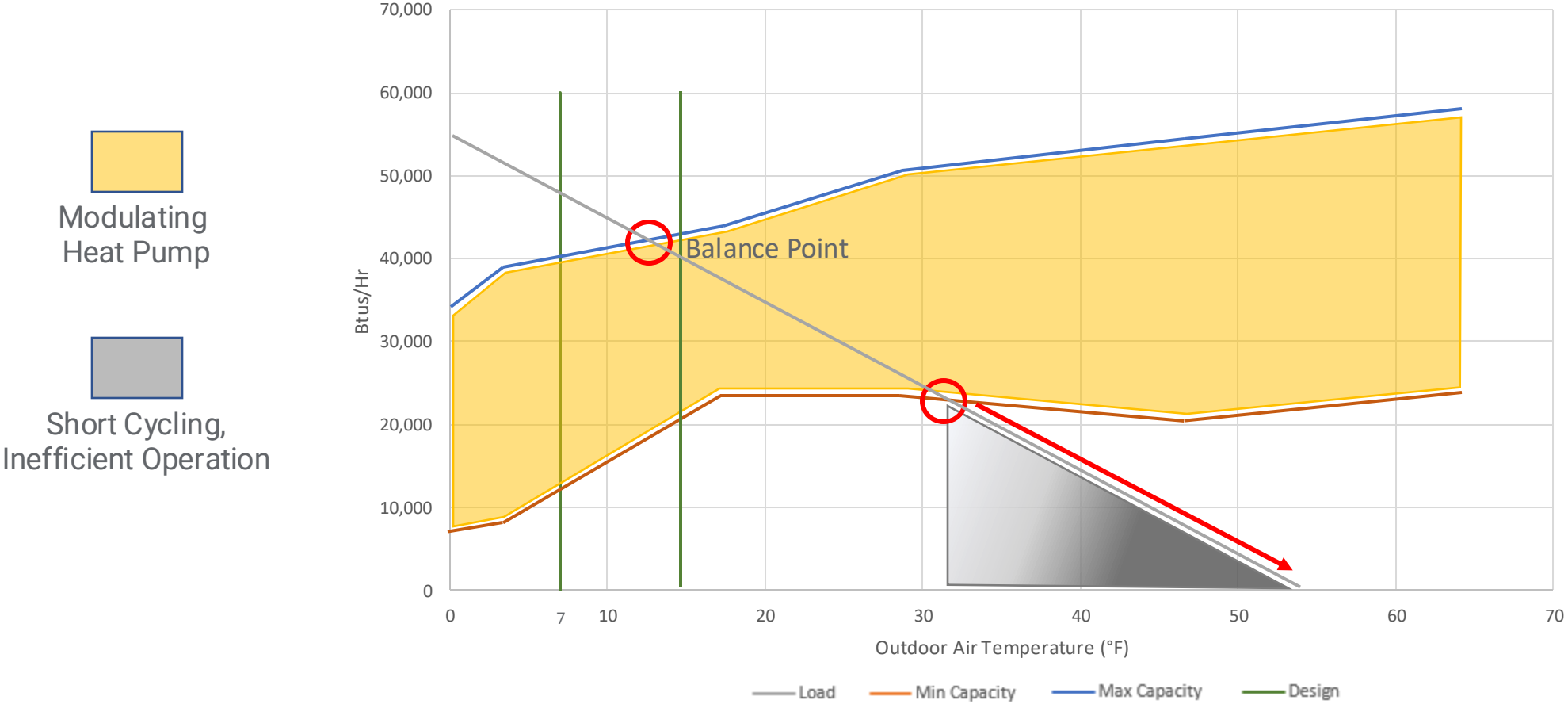
Modulating Heat Pump



Goldilocks Sizing – Let it Modulate

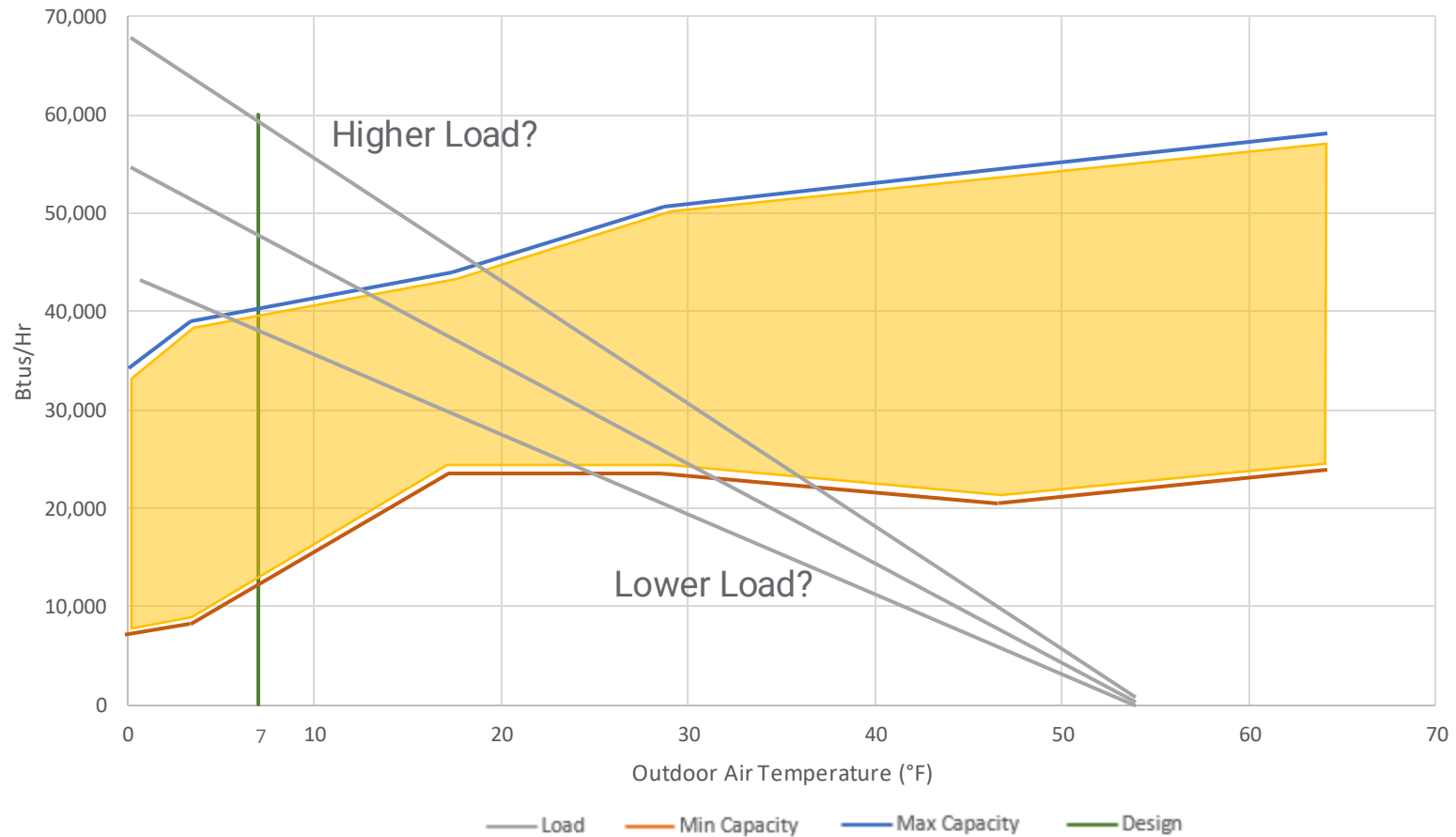


Different Design Temperature?



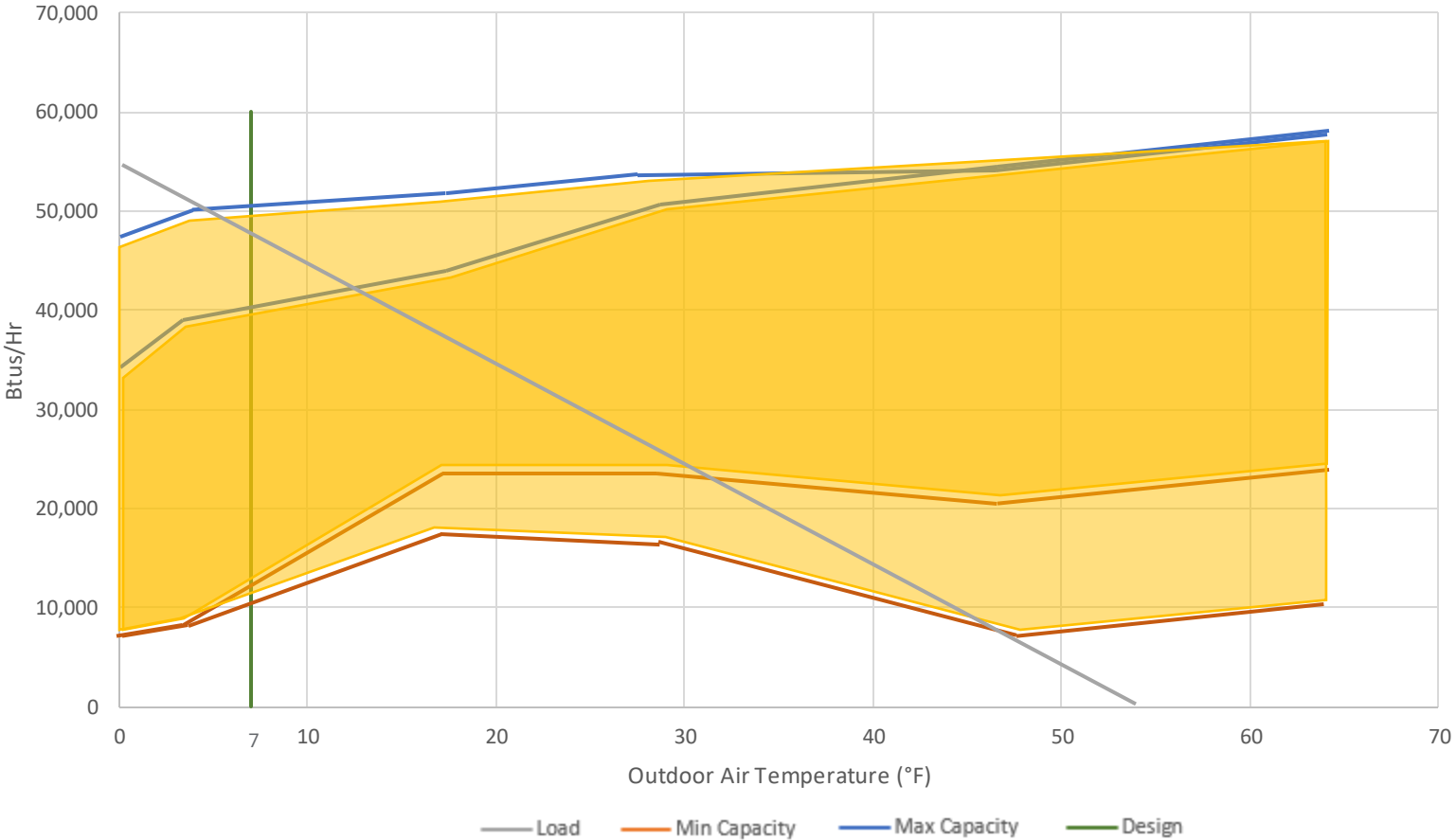
Wrong/Improved Load Line?

Modulating Heat Pump

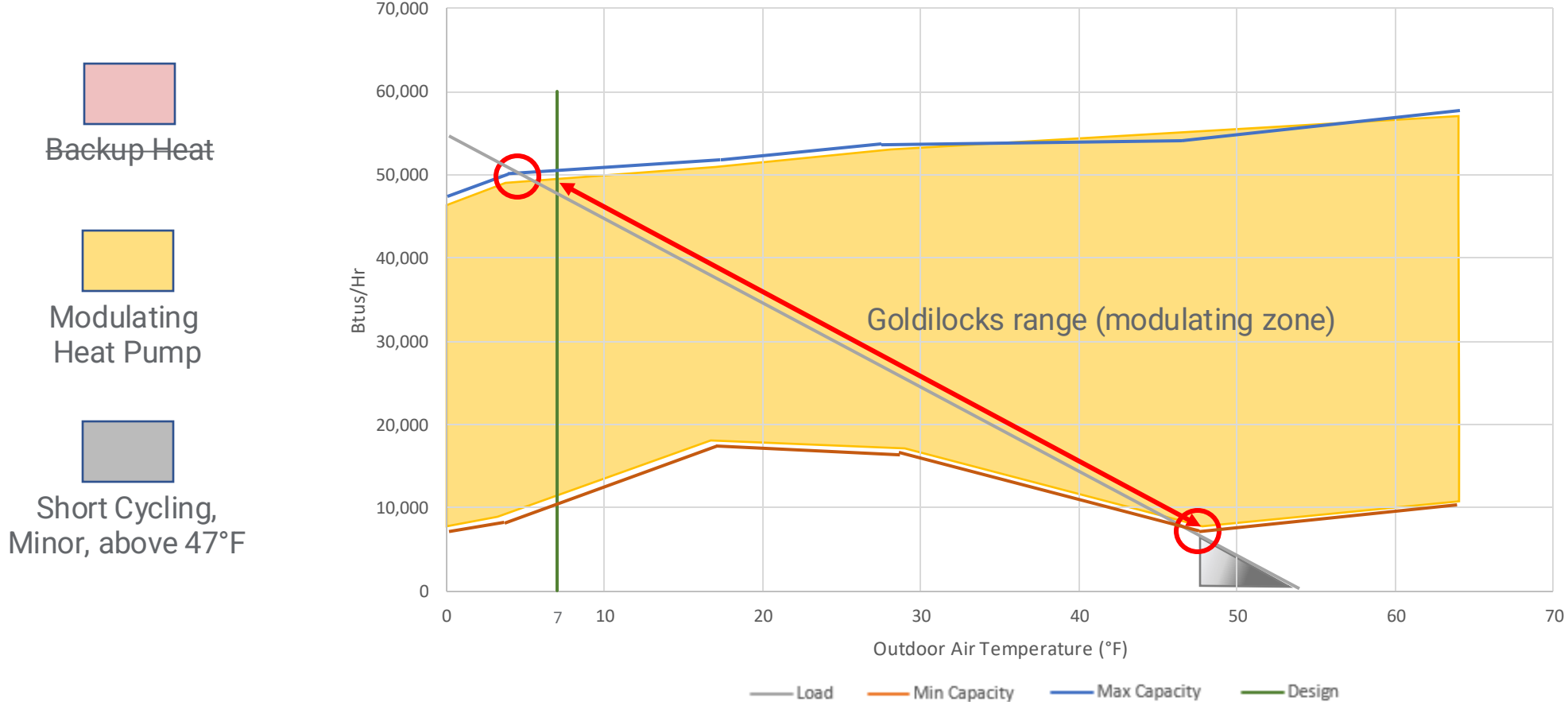


Better Sizing – Different Heat Pump?

Modulating Heat Pump



Better Sizing – Different Heat Pump?



How to Avoid Oversizing

- Conduct an ACCA Manual J Load Calculation
- Use the Correct Design Temperature
- Complete Building Take-offs
- Prepare for the Building's Future
- Look for Systems with Higher Turndown Ratios
- Look at the latent-cooling load, and be prepared to install supplementary dehumidification as needed



Heat Pump Selection and Sizing

Goal #1: Meeting home heating load on the coldest day



Design Load = 28,450 at 7°F

Equipment Candidate

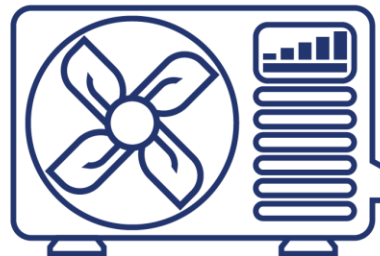
Max Output (Btu/hr)



✗ 21,400 at 7°F



✓ 31,743 at 7°F



✗ 40,850 at 7°F

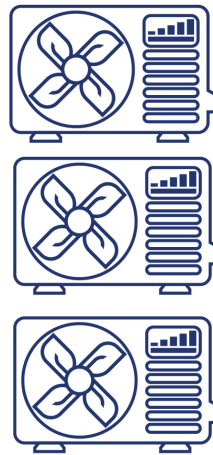
Heat Pump Selection and Sizing

Goal #2: Not providing too much heat on mild days



Design Load = 28,450 at 7°F
Load at 47°F = 4,740 Btu/hr

Equipment Candidate



Max Output (Btu/hr)



28,600 at 7°F



31,743 at 7°F



32,900 at 7°F

Min Output (Btu/hr)



16,600 at 47°F



12,780 at 47°F



7,460 at 47°F

Heat Pump Selection and Sizing

Goal #3: Choose the right product for your need



- Energy efficiency
 - Heating – Heating Seasonal Performance Factor (HSPF): **>10** is preferred
 - Cooling – Seasonal Energy Efficiency Rating (SEER): **>15** is preferred
 - Manufacturer’s extended performance data has higher granularity of efficiency ratings that can help optimize the decision
- Other features/functions
 - Automation and controls
 - Integrated back-up heat
 - Noise rating
- Price – higher efficiency tends to be more expensive

Don't Oversize

- This resource provides information on:
 - The risks of oversizing a heat pump
 - How to identify signs of oversizing
 - How to avoid oversizing
 - Terms to know
- PDF available on the Clean Heat Connect website
 - [CHC-CON-ashp-oversize-fs-1-v1.pdf \(ny.gov\)](https://www.ny.gov/sites/default/files/2022/08/CHC-CON-ashp-oversize-fs-1-v1.pdf)



Over-zoning

Design Intention: Zonal vs. Whole Home

- The home is split into zones, each with its own heating
- Each zone has its own thermostat and controls
- Best for larger homes
- Best for complicated layout



Zonal

- One thermostat controls the entire home
- Best for smaller homes of simple geometry
- Best with ducted systems



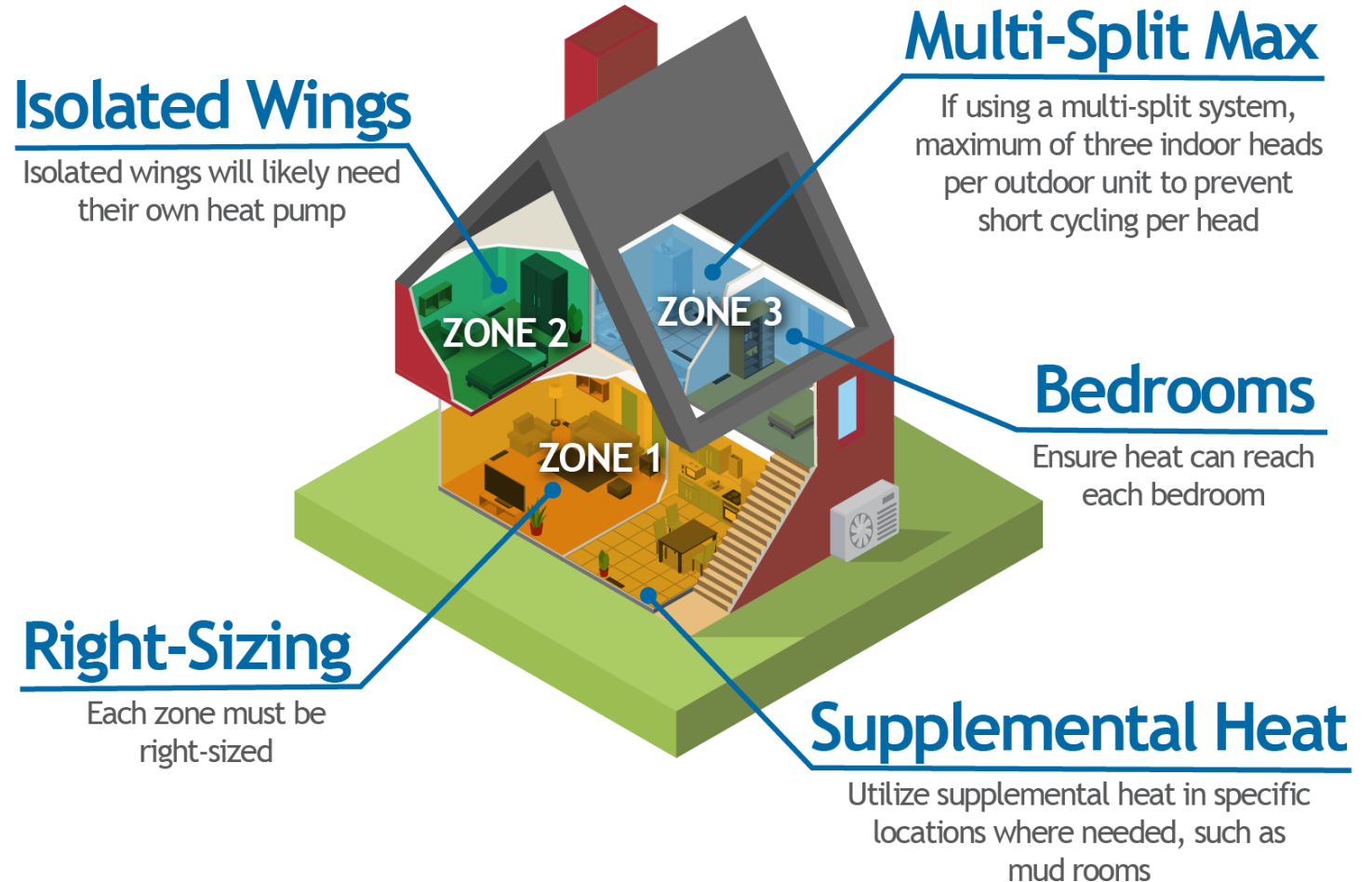
Whole Home

Heat Pump Selection and Sizing

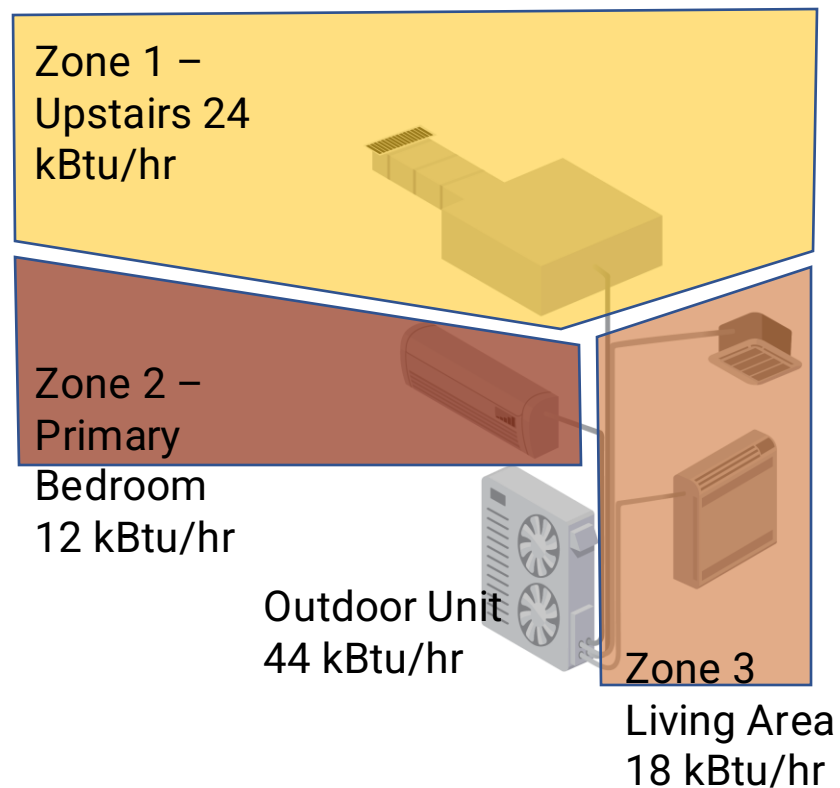
Multi-Zone or Multi-Split Design

For more information about multi-split and single-split head systems, checkout NYSERDA's Clean Heat Connect resources at cleanheatconnect.ny.gov.

Link to PDF:
[https://cleanheatconnect.ny.gov/assets/pdf/Multi vs Single SplitSystems 10 2024 v1.pdf](https://cleanheatconnect.ny.gov/assets/pdf/Multi%20vs%20Single%20Split%20Systems%2010%202024%20v1.pdf)



Avoid Multi-Split Oversizing

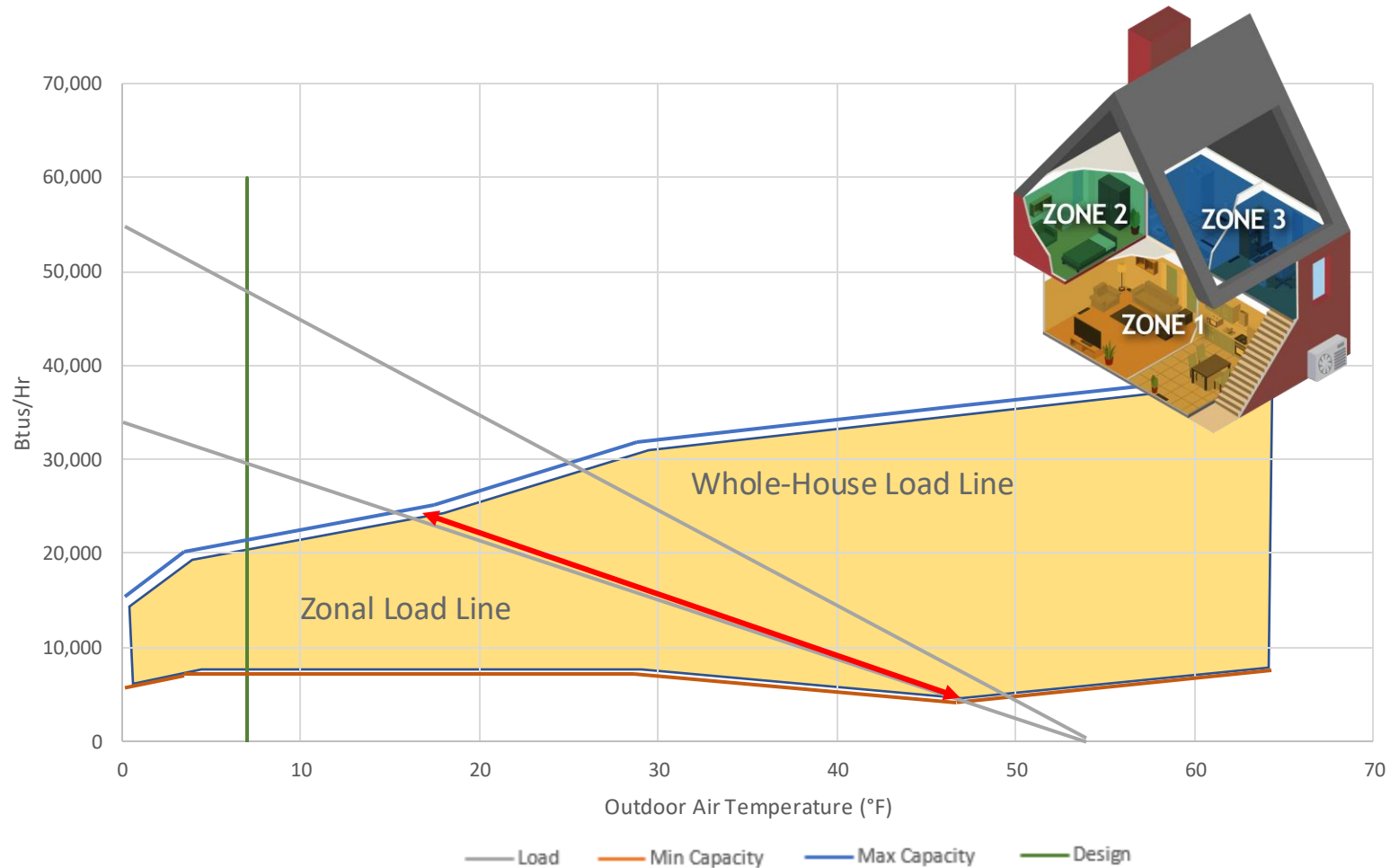


What happens when only one zone is calling for heat?

- Confirm zonal turn down and minimum capacity
- Can impact humidity control as well if short cycling during the cooling season

Zonal Load Sizing

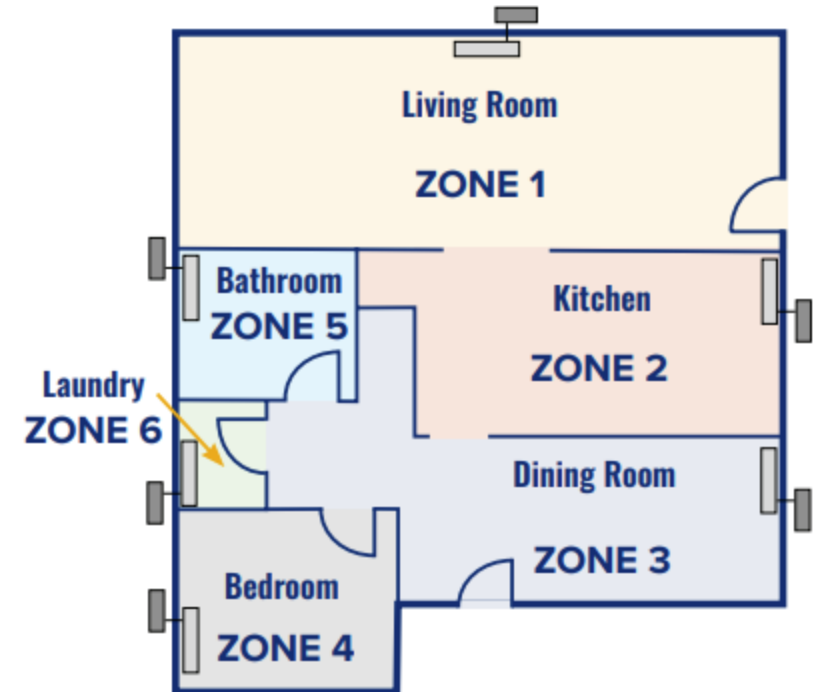
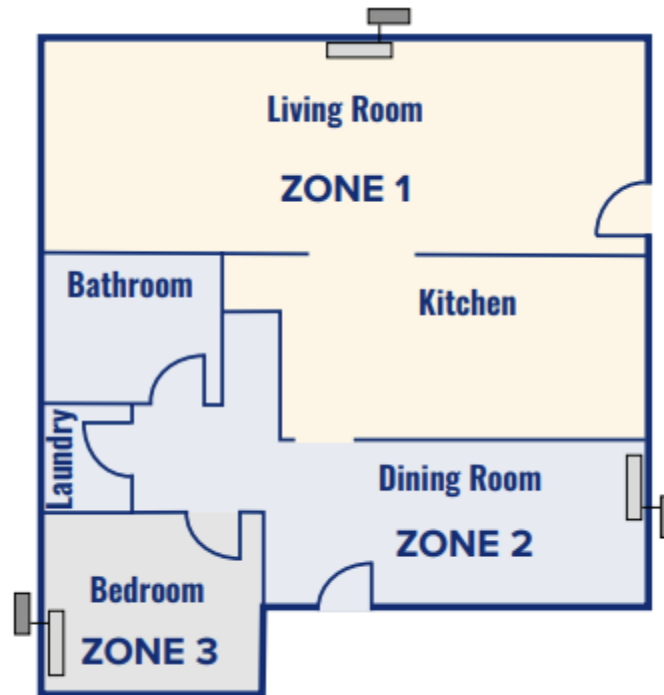
Modulating Heat Pump



Correctly Zoned vs Over-Zoned

Example home:

- Single-family
- Two story
- Saratoga county
- Design temperature: 1°F
- Equipment specifications from ductless single zone products listed on the [NEEP ASHP Product List](#).

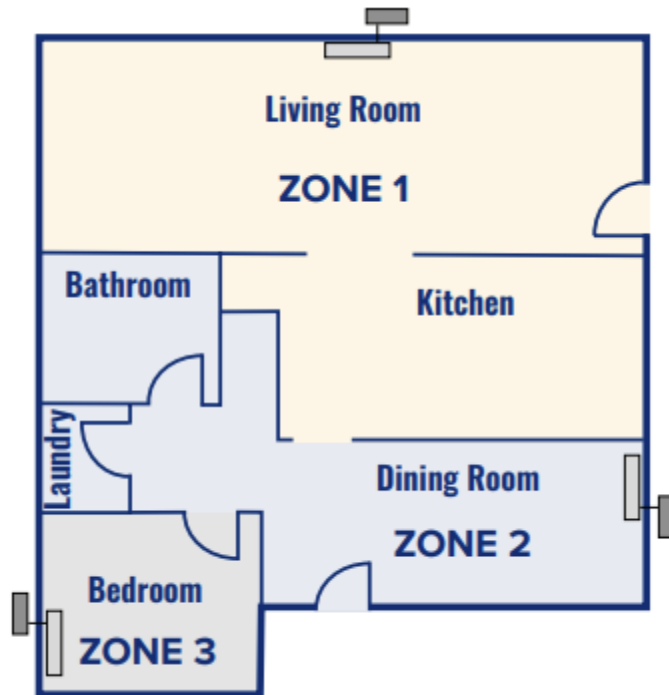


Room by room design load

Room	Living Room	Kitchen	Dining Room	Bedroom	Bathroom	Laundry Room	Total
Design Load (Btu/hour)	15,641	3,535	14,690	8,416	3,018	1,356	46,656

Proper Zoning Design Equipment Performance

Clear air pathways between rooms allow this system to provide sufficient comfort.



	PROPER ZONING			Total
	Zone 1	Zone 2	Zone 3	
	Living Room Kitchen	Dining Room Bathroom Laundry	Bedroom	
Nominal Capacity (Btu/hour)	15,000	18,000	6,000 ¹	39,000
Max. Capacity at Design Temp. (°F)	18,258	21,689	9,778	49,725
Percent Design Load Served²	99.6%	113.8%	116.2%	107%
Percent Annual Heating Load Modulating³	75.2%	79.6%	86.8%	-
Percent Annual Heating Load with Low Load Cycling⁴	14.7%	12.7%	6.2%	-

Over-Zoning Design Equipment Performance

	OVER ZONING						
	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Total
	Living Room	Kitchen	Dining Room	Bedroom	Bathroom	Laundry	
Nominal Capacity (Btu/hour)	15,000	6,000	15,000	9,000	6,000	6,000	57,000
Max. Capacity Design Temp. (°F)	18,258	9,778	18,258	10,792	9,778	9,778	76,642
Percent Design Load Served⁵	116.7%	364.7%	124.3%	128.2%	324%	721.1%	134.4%
Percent Annual Heating Load Modulating⁶	74.1%	53.1%	70.9%	88.2%	60%	21.4%	-
Percent Annual Heating Load with Low Load Cycling⁷	18.7%	44.6%	22.8%	6.2%	37.6%	77.1%	-

The six-zone system performance data shows how improperly zoning a system may lead to oversizing. Three of the systems are substantially oversized, even when using the smallest available products.

This system will result in poor performance, more callbacks, and customer complaints.

Reduce Over Zoning

Air Source Heat Pumps Reduce Over Zoning



Over zoning may result in system over sizing, higher costs, comfort issues, and call backs

Zoning offers improved comfort, control and flexibility

Zoning can better accommodate occupants with differing temperature and humidity preferences. It can also provide uniform temperature and humidity throughout homes with varying heating and cooling loads.



Heat pumps allow for new and useful styles of zoning you can't get from traditional fossil fuel heating and cool air conditioning systems. With heat pumps, zoning can be more easy, accurate, compact, durable, or a mix of each, offering greater flexibility in installation.



- BE CAREFUL!** With the ability to customize a heat pump system, it can be easy to over zone, resulting in an oversized system. Proper zoning requires a careful look at the system as a whole and "right sizing" the heat pump and distribution system to meet each zone's heating and cooling loads. An improperly sized and oversized system can lead to:
- Higher up-front cost
 - Higher utility bills
 - More call backs
 - More equipment failures
 - Reduced equipment lifespan
 - Disatisfied customers

Common Mistake with Zoning

Zoning Heat

If a room's heating or cooling load is smaller than the heat pump's minimum capacity, the heat pump will start cycling.

Common Mistake with Zoning

Commonly, contractors will zone by creating the same zoning systems across rooms. What results is not really a zoning system that meets each room's heating and cooling loads, but a system with oversized units that start cycling.

Rooms where you can skip ductless heads

- Rooms with very low heating/cooling loads
- Rooms with very high ceiling heights
- Rooms with poor thermal envelopes or other factors that cause heating/cooling loads to fluctuate significantly

12 Tips for Zoning with Heat Pumps

Applying these tips will help you avoid common zoning mistakes, ensuring your system is properly sized and installed for optimal performance.

1. Understand the customer's needs: ask about hot and cold spots and discuss with proper temperature preferences.
2. Assess the heating/cooling load: use manual load calculation or software to determine heating/cooling loads for each room, including air infiltration and duct losses for the system.
3. Consider building characteristics: a heat pump may not be the best choice for certain buildings or climates.

When selecting zones

1. Use clear boundaries: use physical walls, doors, and windows to define zones.
2. Create multiple zones within a zone: use physical walls, doors, and windows to define sub-zones.
3. Consider heat-generating loads: use manual load calculation or software to determine heating/cooling loads for each room, including air infiltration and duct losses for the system.

Zoning Heat

Rooms with large open floor plans or large spaces with high ceilings may require zoning for heat loss or gain. Use manual load calculation or software to determine heating/cooling loads for each room, including air infiltration and duct losses for the system.

When installing indoor units

1. Install indoor units with a clear view of the room's ceiling and walls.
2. Avoid installing indoor units near windows or doors to prevent heat loss or gain.

Table 1 and Figure 1 shows the expected performance of a single-zone system. The above table is an example of how over zoning a system may affect system efficiency. Table 2 shows the equipment serving the various zones, and the resulting system performance. The system performance is significantly improved for the zones where zoning is used, resulting in a more efficient system.

Table 1: Over Zoning Design Equipment Performance

	OVER ZONING						Total
	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	
Nominal Capacity (Btu/hour)	8,000	6,300	18,000	9,000	6,000	6,000	51,000
Max. Capacity Design Temp. (°F)	8,250	9,750	18,250	10,750	9,750	9,750	76,500
Percent Design Load Served*	96.2%	64.7%	72.2%	128.2%	64.6%	72.6%	134.4%
Percent Annual Heating Load Served**	74.8%	63.8%	70.4%	88.2%	60%	25.4%	-
Percent Annual Heating Load with Low Load Cycling†	19.7%	44.8%	22.8%	0.2%	37.6%	77.9%	-



The performance data listed in the table and graph are representative of a single-zone system. The performance of a multi-zone system will vary based on the specific zoning strategy used. The above data is for a single-zone system and is not intended to be used for comparison purposes.



Zone Design Example

Comparing Ductless Single-Zone System Designs

Table 1 shows the design loads for all rooms on the first floor of a single-family home. The design loads are based on Manual Load Calculation (MLC) and are used to determine the required capacity of the heat pump system. The design loads are used to compare the performance of a single-zone system with a multi-zone system.

Table 1: Room by Room Design Loads

Room	Heating (Btu/hour)	Cooling (Btu/hour)	Heating (Btu/hour)	Cooling (Btu/hour)	Heating (Btu/hour)	Cooling (Btu/hour)
Living Room	8,000	6,300	18,000	9,000	6,000	6,000
Bedroom	6,000	4,500	12,000	6,000	4,500	4,500
Bathroom	4,000	3,000	8,000	4,000	3,000	3,000
Kitchen	6,000	4,500	12,000	6,000	4,500	4,500
Dining Room	6,000	4,500	12,000	6,000	4,500	4,500
Laundry	6,000	4,500	12,000	6,000	4,500	4,500

Table 2 and Figure 2 shows the expected performance of a three-zone system. The above data is for a three-zone system and is not intended to be used for comparison purposes.

Table 2: Proper Zoning Design Equipment Performance

	PROPER ZONING				Total
	Zone 1	Zone 2	Zone 3	Zone 4	
Nominal Capacity (Btu/hour)	8,000	18,000	6,300	30,300	62,600
Max. Capacity at Design Temp. (°F)	8,250	21,450	6,750	41,175	77,625
Percent Design Load Served*	96.2%	102.8%	102.2%	107%	-
Percent Annual Heating Load Served**	74.8%	76.4%	86.8%	-	-
Percent Annual Heating Load with Low Load Cycling†	19.7%	12.7%	6.2%	-	-



Existing Duct Management

Assessing Existing Ductwork

- Is ductwork visible?
- When was the duct work installed?
 - Older ductwork may not be installed to current building codes
- Was the ductwork installed for heating or cooling?
 - If sized for heating and are newer ducts, may be able to modify for a heat pump system
 - If sized for cooling, the ductwork may be undersized and require more work to make ready for a heat pump system
- Is the ductwork in good condition and properly sealed?



Evaluating a Duct System

➤ Best practices:

- Kitchen table discussion
- Visual inspection
- Sizing evaluation
- Duct testing
- Duct balancing
- *Always use an approved Manual D for duct sizing*

Duct Retrofit Best Practices



- ✓ Interview the homeowner
- ✓ Visually evaluate the ducts
- ✓ Confirm duct capacity meets heat pump needs
- ✓ Non-diagnostic commissioning



- ✓ All ★ items
- ✓ Check total external static pressure (TESP)
- ✓ Verify duct balancing
- ✓ Measure airflow at registers with flow-hood



- ✓ All ★ and ★★ items
- ✓ Assess duct leakage with duct-blaster or blower door and pressure pan
- ✓ Complete a Manual D and compare to existing ducts

Testing the Ductwork

- > Measure air flow
- > Check for duct leakage
- > Verify duct balancing
- > Inform the homeowner:
 - Condition of ducts
 - Needed repairs
 - Necessary modifications
 - Why the ductwork should **not** be reused (when applicable)



Air Source Heat Pump: Cold-Climate Duct Evaluation Guide

Air Source Heat Pump Cold-Climate Duct Evaluation Guide

Evaluate the Duct System Before Heat Pump Installation



Why do Ducts Matter?

Use Existing: If the ducts are in good condition, pass a visual inspection, are within the acceptable range of non-vented water pressure (NWP), are clean, provide sufficient airflow for the heat pump, and do not have leaks or gaps in insulation.

Replace: If the ducts show minor deficiencies, see below or gaps in insulation, if small adjustments can be made to improve the system, or if replacement is already being completed.

Replace or Decommission: If the ducts are showing substantial signs of aging, mold or degrading materials, if the duct capacity is too small for the heat pump, or if the ducts are uninsulated, unconditioned space, and insulation cannot be added in insulation.

Verify Duct Balancing

Turn the fan on high and use a balancing hood or anemometer to measure CFM at each register.

- Turn the fan on high and use a balancing hood or anemometer to measure CFM at each register.
- Calculate the total airflow into each room.
- Divide each room's airflow by its design load to get the room's balancing ratio (CFM/BDU).

Test the Ductwork

Air flow

Duct leakage

Cost of Duct Replacement

Duct Retrofit Best Practice

- Remove all existing ducts
- New vent and registers
- Air sealing
- Insulation
- Disinfectant
- Sealant/foam
- Recess

Kitchen Table Discussions

Visual Evaluation

Duct Testing

Verify Duct Airflow

- How much air in the duct system supposed to handle?
- Are the supply trunks able to handle the airflow?
- Are the supply branches able to handle the airflow?
- Are the return ducts able to handle the airflow?
- Ducts the duct system behave as expected?

NCI Standardized Duct Sizing

Rectangular Duct

CFM	4"	6"	8"	10"	12"	14"	16"	18"	20"
50	8x4	8x6	8x8	8x10	8x12	8x14	8x16	8x18	8x20
100	8x8	10x8	10x10	10x12	10x14	10x16	10x18	10x20	10x24
150	10x8	12x8	12x10	12x12	12x14	12x16	12x18	12x20	12x24
200	12x8	14x8	14x10	14x12	14x14	14x16	14x18	14x20	14x24
250	14x8	16x8	16x10	16x12	16x14	16x16	16x18	16x20	16x24
300	16x8	18x8	18x10	18x12	18x14	18x16	18x18	18x20	18x24
350	18x8	20x8	20x10	20x12	20x14	20x16	20x18	20x20	20x24
400	20x8	22x8	22x10	22x12	22x14	22x16	22x18	22x20	22x24
450	22x8	24x8	24x10	24x12	24x14	24x16	24x18	24x20	24x24
500	24x8	26x8	26x10	26x12	26x14	26x16	26x18	26x20	26x24
550	26x8	28x8	28x10	28x12	28x14	28x16	28x18	28x20	28x24
600	28x8	30x8	30x10	30x12	30x14	30x16	30x18	30x20	30x24
650	30x8	32x8	32x10	32x12	32x14	32x16	32x18	32x20	32x24
700	32x8	34x8	34x10	34x12	34x14	34x16	34x18	34x20	34x24
750	34x8	36x8	36x10	36x12	36x14	36x16	36x18	36x20	36x24
800	36x8	38x8	38x10	38x12	38x14	38x16	38x18	38x20	38x24
850	38x8	40x8	40x10	40x12	40x14	40x16	40x18	40x20	40x24
900	40x8	42x8	42x10	42x12	42x14	42x16	42x18	42x20	42x24
950	42x8	44x8	44x10	44x12	44x14	44x16	44x18	44x20	44x24
1000	44x8	46x8	46x10	46x12	46x14	46x16	46x18	46x20	46x24

Round Metal Pipe

Duct Size	CFM
3"	50
4"	55
5"	60
6"	65
7"	70
8"	75
9"	80
10"	85
11"	90
12"	95
13"	100
14"	105
15"	110
16"	115
17"	120
18"	125
19"	130
20"	135

What is in the Duct Evaluation Guide

- Duct Evaluation Guide guides through the duct evaluation process at the time of bid
 - Understanding the difference between a heat pump and a furnace supply air temperature
 - The need for properly sized ductwork and how to determine duct sizing
 - What impacts the cost of duct replacement
 - Help your customers determine when to:
 - Use existing ducts
 - Modify ducts
 - Replace or decommission ducts
- Additional resources at CEE1.org



NEEP ccASHP Product List

Heat Pump Sizing and Selection Tutorial

NEEP ccASHP Product List

- > Tool Summary
- > Selecting Inputs
- > Sizing a Heat Pump
- > Comparing Products
- > Building a Multiple Compressor System
- > Other Features

Tool Summary

NEEP Tool Walkthrough

- > The NEEP Tool is a product selection tool that searches NEEP's database for cold-climate ASHPs that best fit your project.
- > You can use this tool to select properly sized equipment, compare alternative systems, print submittal documents, and show your customer how well the proposed system fits their home.
- > All information is manufacturer submitted.
- > Open the below link and follow along while we walk you through a mock product selection.
- > <https://ashp.neep.org/#!/>

NEEP Selection Tool

Ready to search the list?

Product Type ⓘ

Central Air Conditioning Hea ▾

Ducting Configuration

All Ducting Configurations ▾

Brand

All Brands ▾

AHRI⁺ or Model# ⓘ

AHRI, Model or Ur

Refrigerant ⓘ

▾

ENERGY STAR Certified ⓘ

- ENERGY STAR V6.1
- ENERGY STAR V6.1 Cold Climate

Eligible for Federal Tax Credit ⓘ

- North
- South

Heat Cap. 47°F Rated Btu/h⁺ ⓘ



Heat Cap. 5°F Max Btu/h ⓘ



SEARCH THE LIST

Advanced Search - Sizing for Heating and Cooling

Selecting Inputs

NEEP Sizing and Selection ccASHP



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On behalf of clean energy and energy efficiency stakeholders, NEEP is pleased to host the Cold Climate Air Source Heat Pump (ccASHP) Product List. This Product List was originally launched in 2015; for more on the background, visit the [ASHP Initiative](#). The list includes ASHP systems that meet the latest version of the [ccASHP Specification](#). The voluntary specification includes requirements for both performance levels and a series of reported performance standards.

Please note that being listed does not necessarily mean a product is appropriate for all cold climate applications. Consumers, contractors, and designers should review building loads, equipment capacities at design temperatures, and other important factors before selecting equipment. Visit NEEP's [Installer and Consumer Resources](#) for more information.

Ready to search the list?

Product Type ⓘ	Ducting Configuration	Brand	AHRI* or Model# ⓘ	Refrigerant ⓘ
Central Air Conditioning Hea ▾	All Ducting Configurations ▾	All Brands ▾	AHRI, Model or Ur	▾
ENERGY STAR Certified ⓘ	Eligible for Federal Tax Credit ⓘ	Heat Cap. 47°F Rated Btu/h⁺ ⓘ	Heat Cap. 5°F Max Btu/h ⓘ	
<input type="checkbox"/> ENERGY STAR V6.1 <input type="checkbox"/> ENERGY STAR V6.1 Cold Climate	<input type="checkbox"/> North <input type="checkbox"/> South	0 ————— 80000	0 ————— 80000	

SEARCH THE LIST

[Advanced Search - Sizing for Heating and Cooling](#)

DISCLAIMER- Some of the performance values reported as part of the Cold Climate ASHP Specification are NOT derived from industry standard test procedures or third-party tested/verified (e.g. performance values at 5°F). Performance in some instances may be represented by manufacturer's engineering data. This site also uses cookies to improve consumer experience.

*AHRI certified and verified product information. Source: ahridirectory.org

Step 1) Select *Advanced Search – Sizing for Heating*

Ready to search the list?

Product Type 


Central Air Conditioning Hea 


Ducting Configuration

All Ducting Configurations 

Brand

All Brands 

AHRI⁺ or Model# 


AHRI, Model or Ur 

Refrigerant 



ENERGY STAR Certified 

- ENERGY STAR V6.1
- ENERGY STAR V6.1 Cold Climate

Eligible for Federal Tax Credit 

- North
- South

Heat Cap. 47°F Rated Btu/h⁺ 



Heat Cap. 5°F Max Btu/h 



SEARCH THE LIST



Advanced Search - Sizing for Heating and Cooling

Step 2) Initial Data

The screenshot shows a software interface for HVAC product selection. The top section contains several dropdown menus and checkboxes. A red arrow points to the 'Product Type' dropdown. Another red arrow points to the 'Ducting Configuration' dropdown, which is set to 'Singlezone Non-Ducted, Wal'. A third red arrow points to the 'Brand' dropdown, which is set to 'SAMSUNG'. A fourth red arrow points to the 'AHRI* or Model#' dropdown. A fifth red arrow points to the 'Refrigerant' dropdown. Below these are checkboxes for 'ENERGY STAR Certified' and 'Eligible for Federal Tax Credit'. A 'Return to Standard Search' button is located below the checkboxes. A yellow warning box contains the text: 'This tool is for preliminary product selection planning only. It is necessary to conduct full engineering capacity assessments that take line-length, multi-head impacts, and other factors into consideration. Use manufacturer's data and tools to finalize product sizing and selection determinations.' The bottom section contains input fields for 'ZipCode', 'Heating Design Temp. (°F)' (7), 'Cooling Design Temp. (°F)' (95), 'Weather Station', 'Heating Design Load (Btu/h)' (25000), and 'Cooling Design Load (Btu/h)' (7500). Red arrows point to the 'ZipCode' and 'Weather Station' dropdowns. Another red arrow points to the 'Heating Design Load' input field. A fourth red arrow points to the 'Cooling Design Load' input field. Below the input fields is a checkbox for 'Limit search to one result per outdoor unit'. At the bottom, there is a link 'Advanced Search - Sizing for Heating and Cooling User Guide and Design Load Calculators', a link 'Click here for Optional Settings', and a 'Run Advanced Sizing for Heating Search' button.

Our mock project is best suited for a multi-zone ductless system.

The project is located in Glens Falls, NY nearest to the Floyd Bennet Memorial weather station.

The Manual J we conducted resulted in a Heating Design Load of 42,000 Btu/h.

The mock distributor sells mainly Mitsubishi Electric products.

Step 3) Click *Run Advanced Sizing for Heating Search*

Product Type ⓘ All Product Types	Ducting Configuration All Ducting Configurations	Brand Mitsubishi Elect	AHRI+ or Model# ⓘ AHRI, Model or Ur	Refrigerant ⓘ
ENERGY STAR Certified ⓘ <input type="checkbox"/> ENERGY STAR V6.1 <input type="checkbox"/> ENERGY STAR V6.1 Cold Climate	Eligible for Federal Tax Credit ⓘ <input type="checkbox"/> North <input type="checkbox"/> South	Heat Cap. 47°F Rated Btu/h+ ⓘ 0 — 80000	Heat Cap. 5°F Max Btu/h ⓘ 0 — 80000	

[Return to Standard Search](#)

This tool is for preliminary product selection planning only. It is necessary to conduct full engineering capacity assessments that take line-length, multi-head impacts, and other factors into consideration. Use manufacturer's data and tools to finalize product sizing and selection determinations.

ZipCode 12801	Heating Design Temp. (°F) ⓘ -2	Cooling Design Temp. (°F) ⓘ 85
Weather Station ⓘ Floyd Bennet Memorial, Winter Design Tei	Heating Design Load (Btu/h) ⓘ 42000	Cooling Design Load (Btu/h) ⓘ 7500
<input checked="" type="checkbox"/> Limit search to one result per outdoor unit ⓘ		

[Advanced Search - Sizing for Heating and Cooling User Guide](#) ⓘ and [Design Load Calculators](#)

[Click here for Optional Settings](#)



[Run Advanced Sizing for Heating Search](#)

Sizing a Heat Pump

Step 4) Sort and analyze the products

Table Information ⓘ

Current Filters (from table below)

Add.	View	Brand Name	AHRI Reference #*	Outdoor Unit Model #**	Indoor Model Number(s)*	Ducting Config*	Max Cap @ Design Temp (Btu/h)...	Capacity Balance Point (*F)...	% Design Load Served ...	% Annual Load Served ...	% Annual Load Modulating	Min Capacity Threshold (*F)
							Greater Than ↔ Less Than	Greater Than ↔ Less Than	Greater Than ↔ Less Than	Greater Than ↔ Less Than	Greater Than ↔ Less Than	Greater Than ↔ Less Than
+	🔗	MITSUBISHI ELECTRIC	202680599	MUZ-GL15NAH***	MSZ-GL15NA***	Singlezone Non-Ducted, ...	No capacity at design Temperature	32	No capacity at design Te...	56.4%	53.2%	52
+	🔗	Trane / Mitsubishi Ele...	211016466	NTXMSM36A142B*		Multizone Mix of Ducted ...	25,228	12	60.1%	83.5%	48.0%	34
+	🔗	Mitsubishi Electric	211016480	MXZ-SM36NAM2		Multizone Mix of Ducted ...	25,228	12	60.1%	83.5%	48.0%	34
+	🔗	TRANE / MITSUBISHI ...	211497116	TRUZA0421KA70**	TPVA0A0421AA***	Singlezone Ducted, Centr...	No capacity at design Temperature	15	No capacity at design Te...	75.2%	44.2%	36
+	🔗	TRANE / MITSUBISHI ...	211497073	NTXSKH30A112AA	NAXAMT30A112**	Singlezone Ducted, Centr...	29,511	13	70.3%	80.5%	61.8%	42
+	🔗	MITSUBISHI ELECTRIC	211259279	PUZ-HA36NKA	PVA-A36AA*	Singlezone Ducted, Centr...	35,044	4	83.4%	89.1%	58.1%	36
+	🔗	MITSUBISHI ELECTRIC	211259274	PUZ-HA30NKA	PVA-A30AA*	Singlezone Ducted, Centr...	29,511	13	70.3%	80.5%	57.7%	40
+	🔗	MITSUBISHI ELECTRIC	211259270	PUZ-HA24NHA1	PCA-A24KA*	Singlezone Non-Ducted, ...	23,978	21	57.1%	72.3%	59.6%	45
+	🔗	MITSUBISHI ELECTRIC	209949001	MXZ-3C30NA3***		Multizone Mix of Ducted ...	No capacity at design Temperature	24	No capacity at design Te...	65.7%	30.2%	34
+	🔗	TRANE / MITSUBISHI ...	211150918	TRUZA0241HA70**	PAA-A18BA*	Singlezone Ducted, Centr...	10,844	35	25.8%	60.2%	43.5%	43
+	🔗	MITSUBISHI ELECTRIC	210435439	PUZ-HA36NKA*	PAA-A36CA1	Singlezone Ducted, Centr...	35,044	4	83.4%	89.1%	51.5%	33
+	🔗	MITSUBISHI ELECTRIC	209447985	PUZ-A36NKA7***	PAA-A36CA1	Singlezone Ducted, Centr...	22,878	17	54.5%	76.1%	40.6%	34
+	🔗	TRANE / MITSUBISHI ...	207702848	TRUZH0241HA10**	TPEADA0241AA***	Singlezone Ducted, Com...	23,056	22	54.9%	71.5%	58.8%	45
+	🔗	MITSUBISHI ELECTRIC	207702722	SUZ-KA30NAHZ	PEAD-A30AA*	Singlezone Ducted, Com...	29,511	13	70.3%	80.5%	57.7%	40

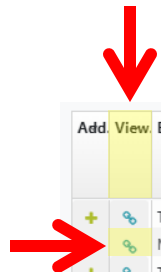


You can sort the products by clicking any of the categories. The most prevalent to product sizing are:

% Annual Load Modulating – The percentage of annual hours that the heat pump is operating within its modulating range. You want this to be as high as possible to maximize the efficiency and minimize the time spent cycling on/off.

% Design Load Served – The percentage of the home’s heating load served by the heat pump at the design temperature. For a full-load system, you want this to be 100-120% to avoid the need for supplemental heat and avoid oversizing.


Step 5) Select a product to view more info



Add	View	Brand Name	AHRI Reference #	Outdoor Unit Model #	Indoor Model Number(s)	Ducting Config	Max Cap @ Design Temp (Btu/h)	Capacity Balance Point (°F)	% Design Load Served	% Annual Load Served	% Annual Load Modulating	Min Capacity Threshold (°F)
+		TRANE / MITSUBISHI ...	213361523	NTXSPB18B112A*	NAXWPH18B112A*	Singlezone Non-Ducted, ...	20,706	20	49.3%	75.4%	72.2%	52
+		MITSUBISHI ELECTRIC	209832208	MUZ-FS18NAH***	MSZ-FS18NA***	Singlezone Non-Ducted, ...	20,706	20	49.3%	75.4%	72.2%	52
+		TRANE / MITSUBISHI ...	209833000	MUZ-FS18NA***	NTXWPH18B112A*	Singlezone Non-Ducted, ...	20,706	20	49.3%	75.4%	72.2%	52
+		TRANE / MITSUBISHI ...	209832262	NTXSPH18B112A*	NTXWPH18B112A*	Singlezone Non-Ducted, ...	20,706	20	49.3%	75.4%	72.2%	52
+		MITSUBISHI ELECTRIC	207679246	MUZ-GS24NA***	MSZ-GS24NA***	Singlezone Non-Ducted, ...	16,754	21	39.9%	73.3%	65.7%	48
+		Mitsubishi Electric	207679251	MUZ-GS24NAH***	MSZ-GS24NA***	Singlezone Non-Ducted, ...	16,754	21	39.9%	73.3%	65.7%	48
+		TRANE / MITSUBISHI ...	207705522	NTXSST24B112**	NAXWST24B112**	Singlezone Non-Ducted, ...	16,754	21	39.9%	73.3%	65.7%	48
+		TRANE / MITSUBISHI ...	213361521	NTXSPH15B112A*	NAXWPH15B112A*	Singlezone Non-Ducted, ...	17,431	26	41.5%	68.8%	65.6%	52
+		TRANE / MITSUBISHI ...	209832261	NTXSPH15B112A*	NTXWPH15B112A*	Singlezone Non-Ducted, ...	17,431	26	41.5%	68.8%	65.6%	52
+		MITSUBISHI ELECTRIC	209832206	MUZ-FS15NAH***	MSZ-FS15NA***	Singlezone Non-Ducted, ...	17,431	26	41.5%	68.8%	65.6%	52
+		TRANE / MITSUBISHI ...	209832995	MUZ-FS15NA***	NTXWPH15B112A*	Singlezone Non-Ducted, ...	17,431	26	41.5%	68.8%	65.6%	52
+		Trane / Mitsubishi Ele...	207705540	NTXSSH18A112**	NAXWST18B112**	Singlezone Non-Ducted, ...	17,028	26	40.5%	69.2%	63.0%	49

Note: You can select multiple products to provide alternate options. The first product is not always the best option or readily available at your distributor.

Available Data



MITSUBISHI ELECTRIC M-Series
Central Air Conditioning Heat Pump (HP)
Singlezone Non-Ducted, Wall Placement
AHRI Cert #: 209832208
Outdoor Unit Model #: MUZ-FS18NAH***
Indoor Model #: MSZ-FS18NA***

Maximum Heating Capacity (Btu/h) @5°F: 23,000
Rated Heating Capacity (Btu/h) @47°F: 19,000
Rated Cooling Capacity (Btu/h) @95°F: 17,200

Basic View

Advanced Data - System Sizing

This tool is for preliminary product selection planning only. It is necessary to conduct full engineering capacity assessments that take line-length, multi-head impacts, and other factors into consideration. Use manufacturer's data and tools to finalize product sizing and selection determinations.

ZipCode: 12801 Heating Design Temp. (°F): -2 Cooling Design Temp. (°F): 85

Weather Station: Floyd Bennet Memorial, Winter Design Heating Design Load (Btu/h): 42000 Cooling Design Load (Btu/h): 7500

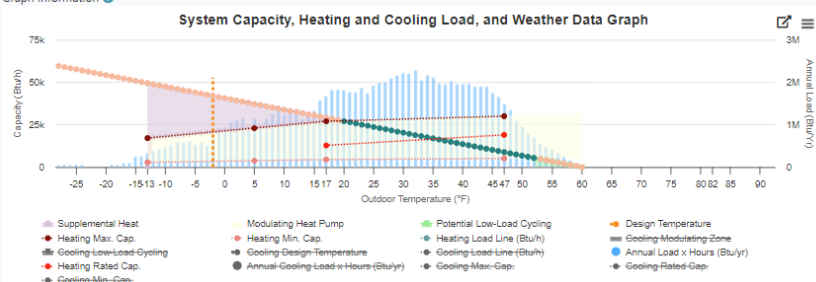
Advanced Search - Sizing for Heating and Cooling User Guide and Design Load Calculators

[Click here for Optional Settings](#)

Run System Sizing

Graph Information

System Capacity, Heating and Cooling Load, and Weather Data Graph



Supplemental Heat Modulating Heat Pump Potential Low-Load Cycling Design Temperature
Heating Max. Cap. Heating Min. Cap. Heating Load Line (Btu/h) Cooling-Modulating-Zone
Cooling-Low-Load-Cycling Cooling-Design-Temperature Cooling-Load-Line (Btu/h) Annual Load x Hours (Btu/yr)
Heating Rated Cap. Annual-Cooling-Load x Hours (Btu/yr) Cooling-Max-Gap Cooling Rated-Gap
Cooling Min-Cap.

Product Sizing For Heating

View Oversizing Effects
Definition/Use Cases

Capacity Balance Point (°F)	20
Minimum Capacity Threshold (°F)	52
Maximum Capacity at Design Temp (Btu/h)	20,706
Percent Design Load Served	49.3%
Annual Heating Load (MMBtu)	96.0
Percent Annual Heating Load Served	75.4%

Definition/Use Cases

Annual Btu's Covered by Supplemental Heat (MMBtu)	23.6
Hours Requiring Supplemental Heat	958
Percent Hours Requiring Supplemental Heat	15.9%
Percent Annual Load Modulating	72.2%
Percent Annual Load with Low-Load Cycling	2.5%

Product Sizing For Cooling

View Oversizing Effects
Definition/Use Cases

Minimum Capacity Threshold (°F)	85
Maximum Capacity at Design Temp (Btu/h)	22,923
Percent Design Load Served	305.6%
Annual Cooling Load (MMBtu)	3.3

Definitions/Use Cases

Percent Annual Cooling Load Served	100.0%
Percent Annual Load Modulating	15.1%
Percent Annual Load with Low-Load Cycling	84.9%

Product Sizing For Cooling

View Oversizing Effects
Definition/Use Cases

Minimum Capacity Threshold (°F)	85
Maximum Capacity at Design Temp (Btu/h)	22,923
Percent Design Load Served	305.6%
Annual Cooling Load (MMBtu)	3.3

Definitions/Use Cases

Percent Annual Cooling Load Served	100.0%
Percent Annual Load Modulating	15.1%
Percent Annual Load with Low-Load Cycling	84.9%

Information Tables


Brand	MITSUBISHI ELECTRIC
Series	M-Series
Ducting Configuration	Singlezone Non-Ducted, Wall Placement
AHRI Certificate #	209832208
Outdoor Unit Model #	MUZ-FS18NAH***
Indoor Model #	MSZ-FS18NA***
Indoor Unit Type	Mini-Splits
Furnace Model #	
EER*	12.5
SEER*	21
HSPF (Region IV)*	12
EER2*	12.5
SEER2*	21
HSPF2 (Region IV)*	10.3
HSPF2 (Region V)	8.1
ENERGY STAR V6.1	✓
ENERGY STAR V6.1 Cold Climate	✓
ENERGY STAR V5.0	
Federal Tax Credit Eligibility	✓

Performance Specs

Heating / Cooling	Outdoor Dry Bulb	Indoor Dry Bulb	Unit	Min	Rated*	Max
Cooling	95°F	80°F	Btu/h*	6,450	17,200	21,000
			kW	0.41	1.38	2.22
			COP	4.61	3.65	2.77
Cooling	82°F	80°F	Btu/h*	7,150	-	23,500
			kW	0.31	-	1.87
			COP	6.76	-	3.68
Heating	47°F	70°F	Btu/h*	5,150	19,000	30,000
			kW	0.43	1.61	4
			COP	3.51	3.46	2.2
Heating	17°F	70°F	Btu/h*	4,460	12,800	27,000
			kW	0.73	1.28	3.82
			COP	1.79	2.93	2.07
Heating	5°F	70°F	Btu/h*	3,810	-	23,000
			kW	0.64	-	3.25
			COP	1.74	-	2.07
Heating	-13°F	70°F	Btu/h*	2,830	-	17,100
			kW	0.54	-	2.63
			COP	1.54	-	1.91

Comparing Products

Step 6) Select a products to compare



Add	View	Brand Name	AHRI Reference #	Outdoor Unit Model #	Indoor Model Number(s)	Ducting Config	Max Cap @ Design Temp (Btu/h)	Capacity Balance Point (°F)	% Design Load Served	% Annual Load Served	% Annual Load Modulating	Min Capacity Threshold (°F)
+		TRANE / MITSUBISHI ...	213361523	NTXSPB18B112A*	NAXWPH18B112A*	Singlezone Non-Ducted, ...	20,706	20	49.3%	75.4%	72.2%	52
+		MITSUBISHI ELECTRIC	209832208	MUZ-FS18NAH***	MSZ-FS18NA***	Singlezone Non-Ducted, ...	20,706	20	49.3%	75.4%	72.2%	52
+		TRANE / MITSUBISHI ...	209833000	MUZ-FS18NA***	NTXWPH18B112A*	Singlezone Non-Ducted, ...	20,706	20	49.3%	75.4%	72.2%	52
+		TRANE / MITSUBISHI ...	209832262	NTXSPH18B112A*	NTXWPH18B112A*	Singlezone Non-Ducted, ...	20,706	20	49.3%	75.4%	72.2%	52
+		MITSUBISHI ELECTRIC	207679246	MUZ-GS24NA***	MSZ-GS24NA***	Singlezone Non-Ducted, ...	16,754	21	39.9%	73.3%	65.7%	48
+		Mitsubishi Electric	207679251	MUZ-GS24NAH***	MSZ-GS24NA***	Singlezone Non-Ducted, ...	16,754	21	39.9%	73.3%	65.7%	48
+		TRANE / MITSUBISHI ...	207705522	NTXSST24B112**	NAXWST24B112**	Singlezone Non-Ducted, ...	16,754	21	39.9%	73.3%	65.7%	48
+		TRANE / MITSUBISHI ...	213361521	NTXSPH15B112A*	NAXWPH15B112A*	Singlezone Non-Ducted, ...	17,431	26	41.5%	68.8%	65.6%	52
+		TRANE / MITSUBISHI ...	209832261	NTXSPH15B112A*	NTXWPH15B112A*	Singlezone Non-Ducted, ...	17,431	26	41.5%	68.8%	65.6%	52
+		MITSUBISHI ELECTRIC	209832206	MUZ-FS15NAH***	MSZ-FS15NA***	Singlezone Non-Ducted, ...	17,431	26	41.5%	68.8%	65.6%	52
+		TRANE / MITSUBISHI ...	209832995	MUZ-FS15NA***	NTXWPH15B112A*	Singlezone Non-Ducted, ...	17,431	26	41.5%	68.8%	65.6%	52
+		Trane / Mitsubishi Ele...	207705540	NTXSSH18A112**	NAXWST18B112**	Singlezone Non-Ducted, ...	17,028	26	40.5%	69.2%	63.0%	49

Note: You can select multiple products to compare. The first product is not always the best option or readily available at your distributor.


Step 7) Click Compare Products

+	View	Brand Name	AHRI Reference #	Outdoor Unit Model #	Indoor Model Number(s)	Ducting Config	Max Cap @ Design Temp (Btu/h)	Capacity Balance Point (°F)	% Design Load Served	% Annual Load Served	% Annual Load Modulating	Min Capacity Threshold (°F)
							Greater Than ↔ Less Than	Greater Than ↔ Less Than	Greater Than ↔ Less Than	Greater Than ↔ Less Than	Greater Than ↔ Less Than	Greater Than ↔ Less Than
+		TRANE / MITSUBISHI ...	213361523	NTXSPB18B112A*	NAXWPH18B112A*	Singlezone Non-Ducted, ...	20,706	20	49.3%	75.4%	72.2%	52
+		MITSUBISHI ELECTRIC	209832208	MUZ-FS18NAH***	MSZ-FS18NA***	Singlezone Non-Ducted, ...	20,706	20	49.3%	75.4%	72.2%	52
+		TRANE / MITSUBISHI ...	209833000	MUZ-FS18NA***	NTXWPH18B112A*	Singlezone Non-Ducted, ...	20,706	20	49.3%	75.4%	72.2%	52
+		TRANE / MITSUBISHI ...	209832262	NTXSPH18B112A*	NTXWPH18B112A*	Singlezone Non-Ducted, ...	20,706	20	49.3%	75.4%	72.2%	52
+		MITSUBISHI ELECTRIC	207679246	MUZ-GS24NA***	MSZ-GS24NA***	Singlezone Non-Ducted, ...	16,754	21	39.9%	73.3%	65.7%	48
+		Mitsubishi Electric	207679251	MUZ-GS24NAH***	MSZ-GS24NA***	Singlezone Non-Ducted, ...	16,754	21	39.9%	73.3%	65.7%	48
+		TRANE / MITSUBISHI ...	207705522	NTXSST24B112**	NAXWST24B112**	Singlezone Non-Ducted, ...	16,754	21	39.9%	73.3%	65.7%	48
+		TRANE / MITSUBISHI ...	213361521	NTXSPB15B112A*	NAXWPH15B112A*	Singlezone Non-Ducted, ...	17,431	26	41.5%	68.8%	65.6%	52
+		TRANE / MITSUBISHI ...	209832261	NTXSPH15B112A*	NTXWPH15B112A*	Singlezone Non-Ducted, ...	17,431	26	41.5%	68.8%	65.6%	52
+		MITSUBISHI ELECTRIC	209832206	MUZ-FS15NAH***	MSZ-FS15NA***	Singlezone Non-Ducted, ...	17,431	26	41.5%	68.8%	65.6%	52
+		TRANE / MITSUBISHI ...	209832995	MUZ-FS15NA***	NTXWPH15B112A*	Singlezone Non-Ducted, ...	17,431	26	41.5%	68.8%	65.6%	52
+		Trane / Mitsubishi Ele...	207705540	NTXSSH18A112**	NAXWST18B112**	Singlezone Non-Ducted, ...	17,028	26	40.5%	69.2%	63.0%	49
+		Trane / Mitsubishi Ele...	207705527	NTXSSH18A112*	MSZ-GS18NA***	Singlezone Non-Ducted, ...	17,028	26	40.5%	69.2%	63.0%	49
+		American Standard / ...	207705502	MUZ-GS18NAHZ***	NAXWST18B112**	Singlezone Non-Ducted, ...	17,028	26	40.5%	69.2%	63.0%	49
+		TRANE / MITSUBISHI ...	209832993	NTXSPB12B112A*	MSZ-FS12NA***	Singlezone Non-Ducted, ...	13,255	32	31.6%	63.9%	62.1%	54
+		MITSUBISHI ELECTRIC	209832204	MUZ-FS12NAH***	MSZ-FS12NA***	Singlezone Non-Ducted, ...	13,255	32	31.6%	63.9%	62.1%	54
+		TRANE / MITSUBISHI ...	209832990	MUZ-FS12NA***	NTXWPH12B112A*	Singlezone Non-Ducted, ...	13,255	32	31.6%	63.9%	62.1%	54
+		TRANE / MITSUBISHI ...	209832260	NTXSPH12B112A*	NTXWPH12B112A*	Singlezone Non-Ducted, ...	13,255	32	31.6%	63.9%	62.1%	54
+		TRANE / MITSUBISHI ...	211497073	NTXSKH30A112AA	NAXAMT30A112**	Singlezone Ducted, Centr...	29,511	13	70.3%	80.5%	61.8%	42
+		MITSUBISHI ELECTRIC	213617714	SUZ-KA30NAHZ1***	SVZ-KP30NA*	Singlezone Ducted, Centr...	29,511	13	70.3%	80.5%	61.8%	42
+		TRANE / MITSUBISHI ...	209832988	NTXSPB09B112A*	MSZ-FS09NA***	Singlezone Non-Ducted, ...	10,194	36	24.3%	62.2%	61.7%	57
+		MITSUBISHI ELECTRIC	209832202	MUZ-FS09NAH***	MSZ-FS09NA***	Singlezone Non-Ducted, ...	10,194	36	24.3%	62.2%	61.7%	57
+		TRANE / MITSUBISHI ...	209832985	MUZ-FS09NA***	NTXWPH09B112A*	Singlezone Non-Ducted, ...	10,194	36	24.3%	62.2%	61.7%	57
+		TRANE / MITSUBISHI ...	209832259	NTXSPH09B112A*	NTXWPH09B112A*	Singlezone Non-Ducted, ...	10,194	36	24.3%	62.2%	61.7%	57


Select up to 5 products



TRANE / MITSUBISHI
ELECTRIC
Model Series: M-Series
AHRI #: 209832208
Count: 1




MITSUBISHI ELECTRIC
Model Series: M-Series
AHRI #: 209832208
Count: 1



TRANE / MITSUBISHI
ELECTRIC
Model Series: M-Series



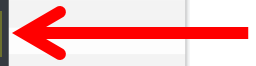
TRANE / MITSUBISHI
ELECTRIC
Model Series: M-Series



TRANE / MITSUBISHI
ELECTRIC
Model Series: M-Series

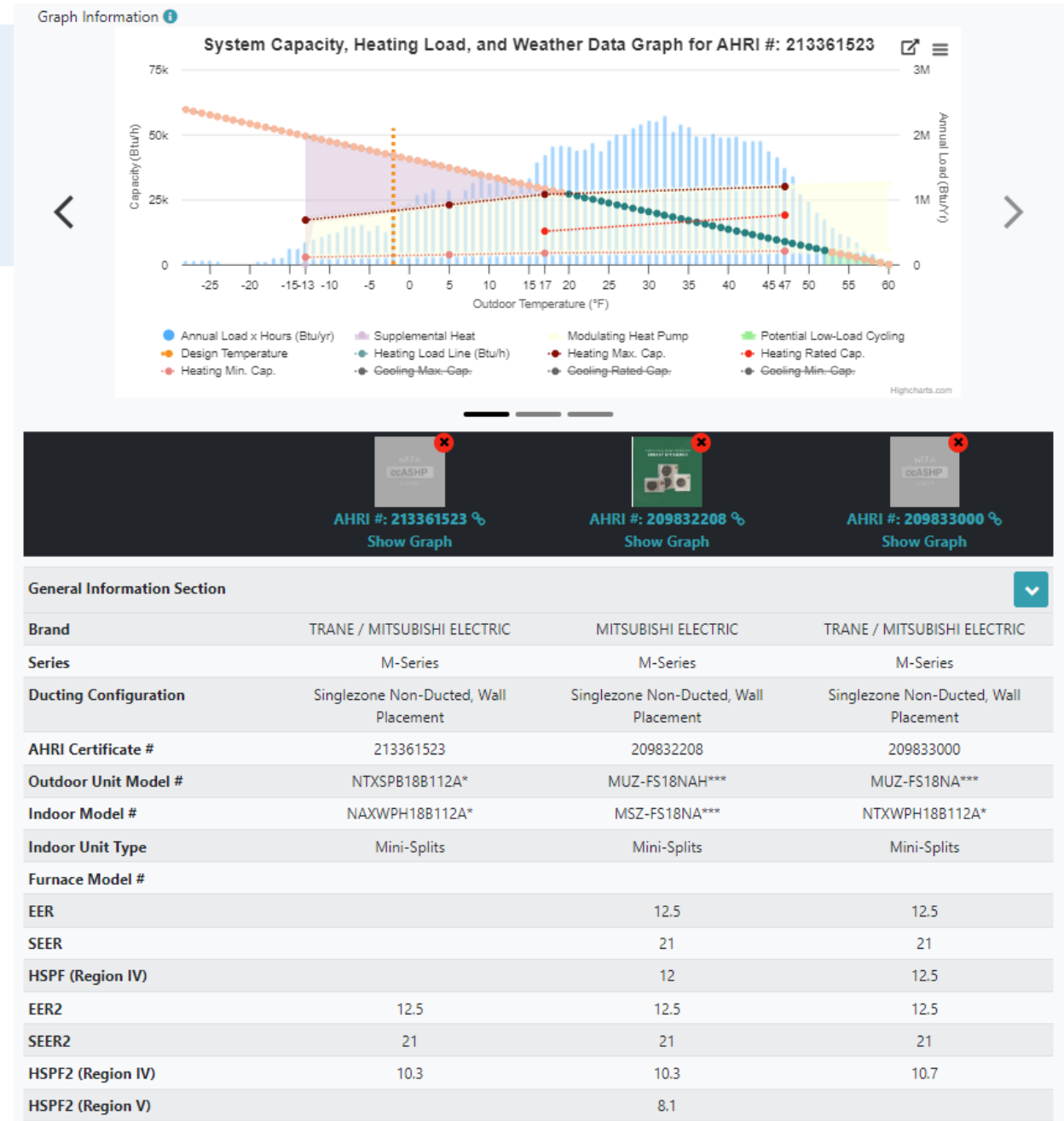
Compare Products

Stack Products



Compare Products

- Graph displays only one product selected. You can cycle through the graph for each selected product.
- Data for all products selected will be displayed side by side below the graph.




Building a Multiple Compressor System



NYSERDA

Step 8) Select a product to stack




Add	View	Brand Name	AHRI Reference #	Outdoor Unit Model #	Indoor Model Number(s)	Ducting Config	Max Cap @ Design Temp (Btu/h)	Capacity Balance Point (%F)	% Design Load Served	% Annual Load Served	% Annual Load Modulating	Min Capacity Threshold (%F)
+		TRANE / MITSUBISHI ...	213361523	NTXSPB18B112A*	NAXWPH18B112A*	Singlezone Non-Ducted, ...	20,706	20	49.3%	75.4%	72.2%	52
+		MITSUBISHI ELECTRIC	209832208	MUZ-FS18NAH***	MSZ-FS18NA***	Singlezone Non-Ducted, ...	20,706	20	49.3%	75.4%	72.2%	52
+		TRANE / MITSUBISHI ...	209833000	MUZ-FS18NA***	NTXWPH18B112A*	Singlezone Non-Ducted, ...	20,706	20	49.3%	75.4%	72.2%	52
+		TRANE / MITSUBISHI ...	209832262	NTXSPH18B112A*	NTXWPH18B112A*	Singlezone Non-Ducted, ...	20,706	20	49.3%	75.4%	72.2%	52
+		MITSUBISHI ELECTRIC	207679246	MUZ-GS24NA***	MSZ-GS24NA***	Singlezone Non-Ducted, ...	16,754	21	39.9%	73.3%	65.7%	48
+		Mitsubishi Electric	207679251	MUZ-GS24NAH***	MSZ-GS24NA***	Singlezone Non-Ducted, ...	16,754	21	39.9%	73.3%	65.7%	48
+		TRANE / MITSUBISHI ...	207705522	NTXSST24B112**	NAXWST24B112**	Singlezone Non-Ducted, ...	16,754	21	39.9%	73.3%	65.7%	48
+		TRANE / MITSUBISHI ...	213361521	NTXSPB15B112A*	NAXWPH15B112A*	Singlezone Non-Ducted, ...	17,431	26	41.5%	68.8%	65.6%	52
+		TRANE / MITSUBISHI ...	209832261	NTXSPH15B112A*	NTXWPH15B112A*	Singlezone Non-Ducted, ...	17,431	26	41.5%	68.8%	65.6%	52
+		MITSUBISHI ELECTRIC	209832206	MUZ-FS15NAH***	MSZ-FS15NA***	Singlezone Non-Ducted, ...	17,431	26	41.5%	68.8%	65.6%	52
+		TRANE / MITSUBISHI ...	209832995	MUZ-FS15NA***	NTXWPH15B112A*	Singlezone Non-Ducted, ...	17,431	26	41.5%	68.8%	65.6%	52
+		Trane / Mitsubishi Ele...	207705540	NTXSSH18A112**	NAXWST18B112**	Singlezone Non-Ducted, ...	17,028	26	40.5%	69.2%	63.0%	49

Note: You can select the same product, multiple times to stack. The first product is not always the best option or readily available at your distributor.


Step 9) Click Stack Products

Table Information ⓘ


Current Filters (from table below) 

Add	View	Brand Name	AHRI Reference #	Outdoor Unit Model #	Indoor Model Number(s)	Ducting Config	Max Cap @ Design Temp (Btu/h) x		Capacity Balance Point (°F) x		% Design Load Served x		% Annual Load Served x		% Annual Load Modulating x		Min Capacity Threshold (°F)	
							Greater Than	Less Than	Greater Than	Less Than	Greater Than	Less Than	Greater Than	Less Than	Greater Than	Less Than	Greater Than	Less Than
+		TRANE / MITSUBISHI ...	213361523	NTXSPB18B112A*	NAXWPH18B112A*	Singlezone Non-Ducted, ...	20,706		20		49.3%		75.4%		72.2%		52	
+		MITSUBISHI ELECTRIC	209832208	MUZ-FS18NAH***	MSZ-FS18NA***	Singlezone Non-Ducted, ...	20,706		20		49.3%		75.4%		72.2%		52	
+		TRANE / MITSUBISHI ...	209833000	MUZ-FS18NA***	NTXWPH18B112A*	Singlezone Non-Ducted, ...	20,706		20		49.3%		75.4%		72.2%		52	
+		TRANE / MITSUBISHI ...	209832262	NTXSPH18B112A*	NTXWPH18B112A*	Singlezone Non-Ducted, ...	20,706		20		49.3%		75.4%		72.2%		52	
+		MITSUBISHI ELECTRIC	207679246	MUZ-GS24NA***	MSZ-GS24NA***	Singlezone Non-Ducted, ...	16,754		21		39.9%		73.3%		65.7%		48	
+		Mitsubishi Electric	207679251	MUZ-GS24NAH***	MSZ-GS24NA***	Singlezone Non-Ducted, ...	16,754		21		39.9%		73.3%		65.7%		48	
+		TRANE / MITSUBISHI ...	207705522	NTXST24B112**	NAXWST24B112**	Singlezone Non-Ducted, ...	16,754		21		39.9%		73.3%		65.7%		48	
+		TRANE / MITSUBISHI ...	213361521	NTXSPB15B112A*	NAXWPH15B112A*	Singlezone Non-Ducted, ...	17,431		26		41.5%		68.8%		65.6%		52	
+		TRANE / MITSUBISHI ...	209832261	NTXSPH15B112A*	NTXWPH15B112A*	Singlezone Non-Ducted, ...	17,431		26		41.5%		68.8%		65.6%		52	
+		MITSUBISHI ELECTRIC	209832206	MUZ-FS15NAH***	MSZ-FS15NA***	Singlezone Non-Ducted, ...	17,431		26		41.5%		68.8%		65.6%		52	
+		TRANE / MITSUBISHI ...	209832995	MUZ-FS15NA***	NTXWPH15B112A*	Singlezone Non-Ducted, ...	17,431		26		41.5%		68.8%		65.6%		52	
+		Trane / Mitsubishi Ele...	207705540	NTXSSH18A112**	NAXWST18B112**	Singlezone Non-Ducted, ...	17,028		26		40.5%		69.2%		63.0%		49	
+		Trane / Mitsubishi Ele...	207705527	NTXSSH18A112*	MSZ-GS18NA***	Singlezone Non-Ducted, ...	17,028		26		40.5%		69.2%		63.0%		49	
+		American Standard / ...	207705502	MUZ-GS18NAHZ***	NAXWST18B112**	Singlezone Non-Ducted, ...	17,028		26		40.5%		69.2%		63.0%		49	
+		TRANE / MITSUBISHI ...	209832993	NTXSPB12B112A*	MSZ-FS12NA***	Singlezone Non-Ducted, ...	13,255		32		31.6%		63.9%		62.1%		54	
+		MITSUBISHI ELECTRIC	209832204	MUZ-FS12NAH***	MSZ-FS12NA***	Singlezone Non-Ducted, ...	13,255		32		31.6%		63.9%		62.1%		54	
+		TRANE / MITSUBISHI ...	209832990	MUZ-FS12NA***	NTXWPH12B112A*	Singlezone Non-Ducted, ...	13,255		32		31.6%		63.9%		62.1%		54	
+		TRANE / MITSUBISHI ...	209832260	NTXSPH12B112A*	NTXWPH12B112A*	Singlezone Non-Ducted, ...	13,255		32		31.6%		63.9%		62.1%		54	
+		TRANE / MITSUBISHI ...	211497073	NTXSKH30A112AA	NAXAMT30A112**	Singlezone Ducted, Centr...	29,511		13		70.3%		80.5%		61.8%		42	
+		MITSUBISHI ELECTRIC	213617714	SUZ-KA30NAHZ1***	SVZ-KP30NA*	Singlezone Ducted, Centr...	29,511		13		70.3%		80.5%		61.8%		42	
+		TRANE / MITSUBISHI ...	209832988	NTXSPB09B112A*	MSZ-FS09NA***	Singlezone Non-Ducted, ...	10,194		36		24.3%		62.2%		61.7%		57	
+		MITSUBISHI ELECTRIC	209832202	MUZ-FS09NAH***	MSZ-FS09NA***	Singlezone Non-Ducted, ...	10,194		36		24.3%		62.2%		61.7%		57	
+		TRANE / MITSUBISHI ...	209832985	MUZ-FS09NA***	NTXWPH09B112A*	Singlezone Non-Ducted, ...	10,194		36		24.3%		62.2%		61.7%		57	
+		TRANE / MITSUBISHI ...	209832259	NTXSPH09B112A*	NTXWPH09B112A*	Singlezone Non-Ducted, ...	10,194		36		24.3%		62.2%		61.7%		57	


Select up to 5 products




MITSUBISHI ELECTRIC
Model Series: M-Series
AHRI #: 209832208
Count: 2




ccASHP



ccASHP



ccASHP

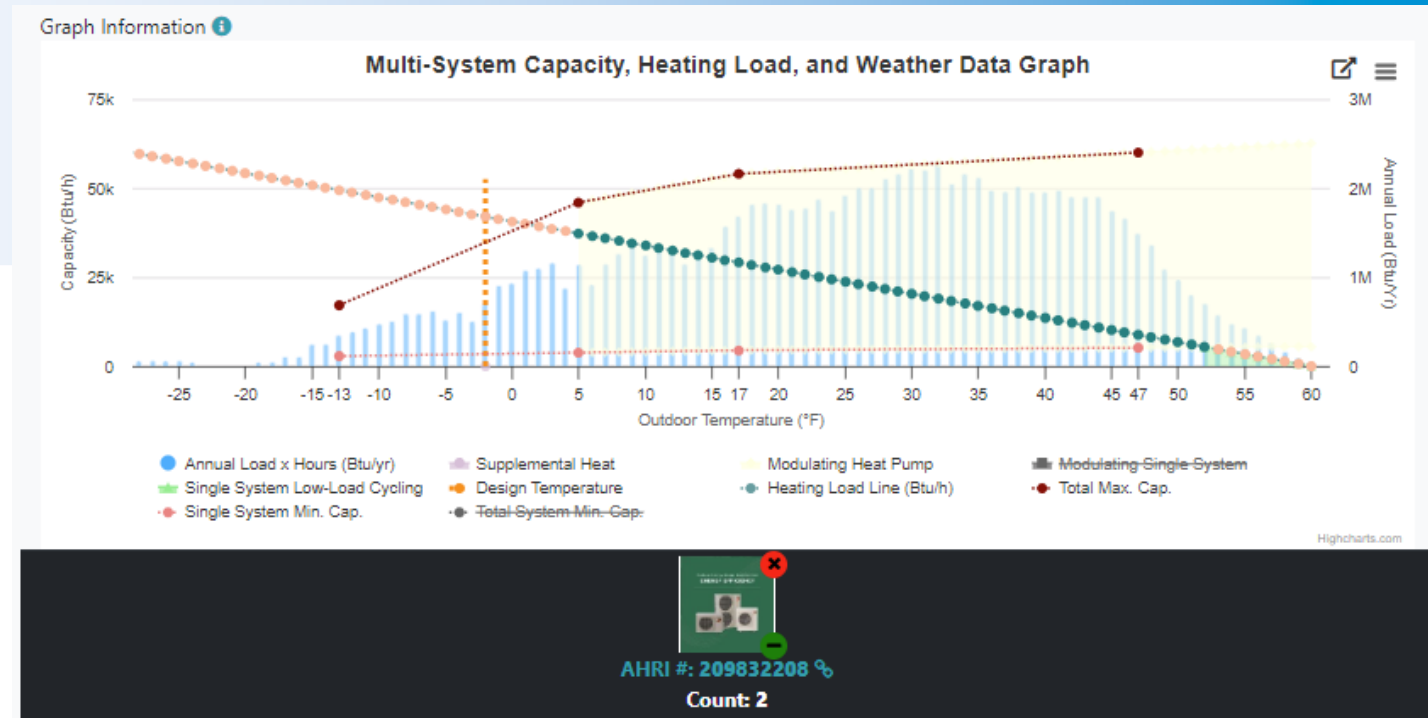


ccASHP

Stack Products

Stacked Products

➤ Shows multiple compressors and data based on running those products together graphically



➤ Shows multiple compressors and data based on running those products

Stacked Product Sizing For Heating

Field Information ⓘ

Capacity Balance Point (°F)	-2
Minimum Capacity Threshold (°F)	52
Maximum Capacity at Design Temp (Btu/h)	No capacity at design Temperature
Percent Design Load Served	No capacity at design Temperature
Percent Annual Heating Load Served	93.0%
Annual Btu's Covered by Supplemental Heat (MMBtu)	6.7

Field Information ⓘ

Hours Requiring Supplemental Heat	144
Percent Annual Load Modulating	89.8%
Percent Annual Load with Low-Load Cycling	%
Heat Pump Primacy Threshold	45
Annual Hours Primacy Cycling	1066
Percent Annual Load Primacy Cycling	8.4

Select better fitting products

Table Information ⓘ

Advanced Filters (from table below)

Add	View	Brand Name	AHRI Reference #*	Outdoor Unit Model #**	Indoor Model Number(s)*	Ducting Config*	Max Cap @ Design Temp (Btu/h)...		Capacity Balance Point (°F)...		% Design Load Served ..		% Annual Load Served ..		% Annual Load Modulating		Min Capacity Threshold (°F)	
							Greater Than	Less Than	Greater Than	Less Than	Greater Than	Less Than	Greater Than	Less Than	Greater Than	Less Than	Greater Than	Less Than
+	🔗	TRANE / MITSUBISHI ...	213361523	NTXSPB18B112A*	NAXWPH18B112A*	Singlezone Non-Ducted, ...	20,706		20		49.3%	75.4%	72.2%		52			
+	🔗	MITSUBISHI ELECTRIC	209832208	MUZ-FS18NAH***	MSZ-FS18NA***	Singlezone Non-Ducted, ...	20,706		20		49.3%	75.4%	72.2%		52			
+	🔗	TRANE / MITSUBISHI ...	209833000	MUZ-FS18NA***	NTXWPH18B112A*	Singlezone Non-Ducted, ...	20,706		20		49.3%	75.4%	72.2%		52			
+	🔗	TRANE / MITSUBISHI ...	209832262	NTXSPH18B112A*	NTXWPH18B112A*	Singlezone Non-Ducted, ...	20,706		20		49.3%	75.4%	72.2%		52			
+	🔗	MITSUBISHI ELECTRIC	207679246	MUZ-GS24NA***	MSZ-GS24NA***	Singlezone Non-Ducted, ...	16,754		21		39.9%	73.3%	65.7%		48			
+	🔗	Mitsubishi Electric	207679251	MUZ-GS24NAH***	MSZ-GS24NA***	Singlezone Non-Ducted, ...	16,754		21		39.9%	73.3%	65.7%		48			
+	🔗	TRANE / MITSUBISHI ...	207705522	NTXSST24B112**	NAXWST24B112**	Singlezone Non-Ducted, ...	16,754		21		39.9%	73.3%	65.7%		48			
+	🔗	TRANE / MITSUBISHI ...	213361521	NTXSPB15B112A*	NAXWPH15B112A*	Singlezone Non-Ducted, ...	17,431		26		41.5%	68.8%	65.6%		52			
+	🔗	TRANE / MITSUBISHI ...	209832261	NTXSPH15B112A*	NTXWPH15B112A*	Singlezone Non-Ducted, ...	17,431		26		41.5%	68.8%	65.6%		52			
+	🔗	MITSUBISHI ELECTRIC	209832206	MUZ-FS15NAH***	MSZ-FS15NA***	Singlezone Non-Ducted, ...	17,431		26		41.5%	68.8%	65.6%		52			
+	🔗	TRANE / MITSUBISHI ...	209832995	MUZ-FS15NA***	NTXWPH15B112A*	Singlezone Non-Ducted, ...	17,431		26		41.5%	68.8%	65.6%		52			
+	🔗	Trane / Mitsubishi Ele...	207705540	NTXSSH18A112**	NAXWST18B112**	Singlezone Non-Ducted, ...	17,028		26		40.5%	69.2%	63.0%		49			
+	🔗	Trane / Mitsubishi Ele...	207705527	NTXSSH18A112*	MSZ-GS18NA***	Singlezone Non-Ducted, ...	17,028		26		40.5%	69.2%	63.0%		49			
+	🔗	American Standard / ...	207705502	MUZ-GS18NAHZ***	NAXWST18B112**	Singlezone Non-Ducted, ...	17,028		26		40.5%	69.2%	63.0%		49			
+	🔗	TRANE / MITSUBISHI ...	209832993	NTXSPB12B112A*	MSZ-FS12NA***	Singlezone Non-Ducted, ...	13,255		32		31.6%	63.9%	62.1%		54			
+	🔗	MITSUBISHI ELECTRIC	209832204	MUZ-FS12NAH***	MSZ-FS12NA***	Singlezone Non-Ducted, ...	13,255		32		31.6%	63.9%	62.1%		54			
+	🔗	TRANE / MITSUBISHI ...	209832990	MUZ-FS12NA***	NTXWPH12B112A*	Singlezone Non-Ducted, ...	13,255		32		31.6%	63.9%	62.1%		54			
+	🔗	TRANE / MITSUBISHI ...	209832260	NTXSPH12B112A*	NTXWPH12B112A*	Singlezone Non-Ducted, ...	13,255		32		31.6%	63.9%	62.1%		54			
+	🔗	TRANE / MITSUBISHI ...	211497073	NTXSKH30A112AA	NAXAMT30A112**	Singlezone Ducted, Centr...	29,511		13		70.3%	80.5%	61.8%		42			
+	🔗	MITSUBISHI ELECTRIC	213617714	SUZ-KA30NAHZ1***	SVZ-KP30NA*	Singlezone Ducted, Centr...	29,511		13		70.3%	80.5%	61.8%		42			
+	🔗	TRANE / MITSUBISHI ...	209832988	NTXSPB09B112A*	MSZ-FS09NA***	Singlezone Non-Ducted, ...	10,194		36		24.3%	62.2%	61.7%		57			
+	🔗	MITSUBISHI ELECTRIC	209832202	MUZ-FS09NAH***	MSZ-FS09NA***	Singlezone Non-Ducted, ...	10,194		36		24.3%	62.2%	61.7%		57			
+	🔗	TRANE / MITSUBISHI ...	209832985	MUZ-FS09NA***	NTXWPH09B112A*	Singlezone Non-Ducted, ...	10,194		36		24.3%	62.2%	61.7%		57			
+	🔗	TRANE / MITSUBISHI ...	209832259	NTXSPH09B112A*	NTXWPH09B112A*	Singlezone Non-Ducted, ...	10,194		36		24.3%	62.2%	61.7%		57			

Select up to 5 products

TRANE / MITSUBISHI
ELECTRIC
Model Series: NV-Series

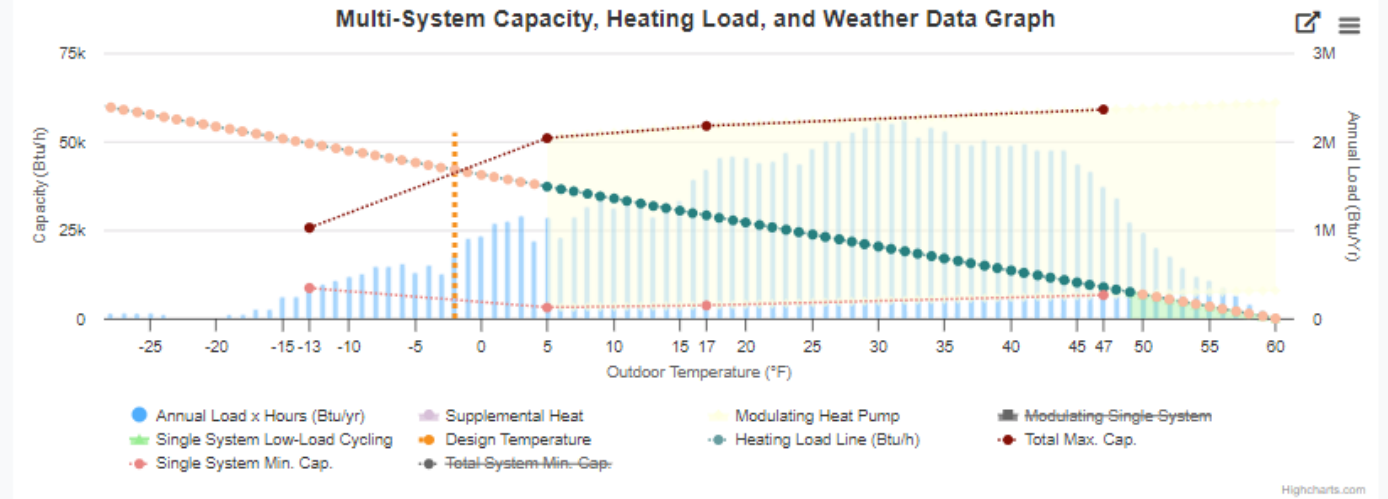
Trane / Mitsubishi Electric
Model Series: NV-Series
AHRI #: 207705527
Count: 1

Compare Products

Stack Products

Selecting the right equipment

Graph Information ⓘ



AHRI #: 211497073

Count: 1

AHRI #: 207705527

Count: 1

Stacked Product Sizing For Heating

Field Information ⓘ

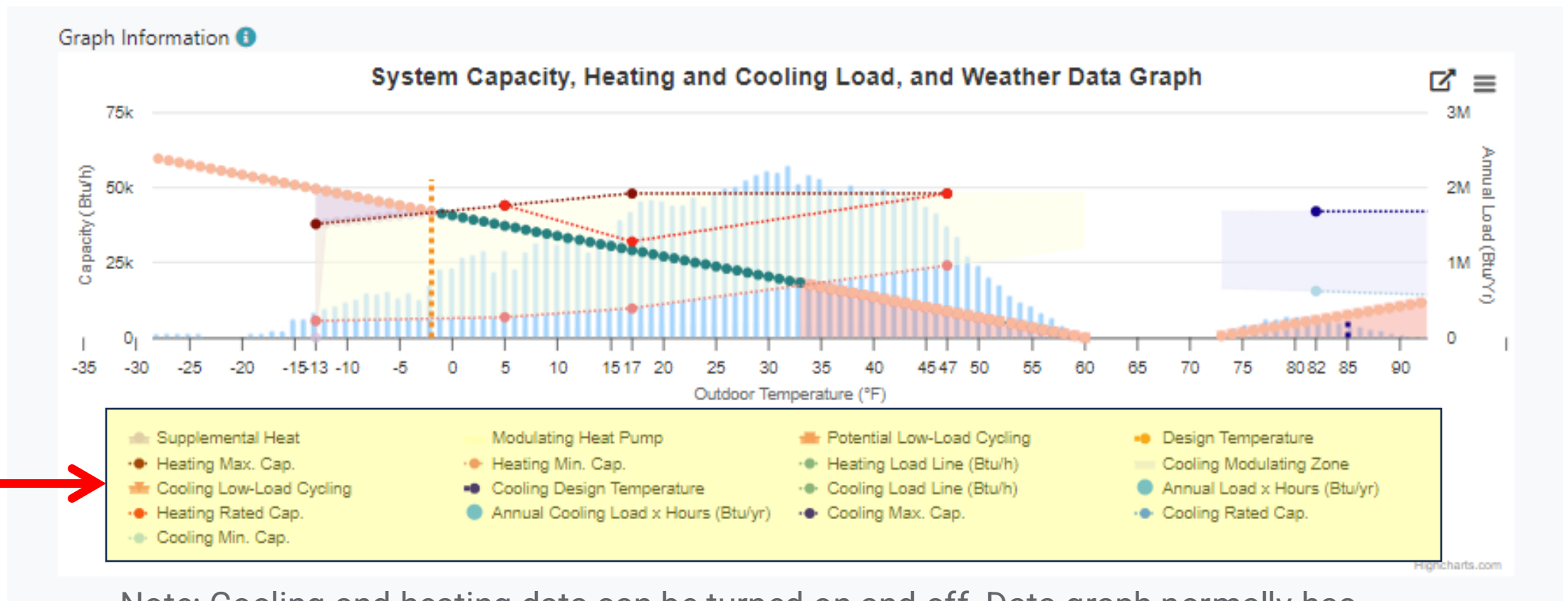
Capacity Balance Point (°F)	-9
Minimum Capacity Threshold (°F)	49
Maximum Capacity at Design Temp (Btu/h)	No capacity at design Temperature
Percent Design Load Served	No capacity at design Temperature
Percent Annual Heating Load Served	97.1%
Annual Btu's Covered by Supplemental Heat (MMBtu)	2.8

Field Information ⓘ

Hours Requiring Supplemental Heat	55
Percent Annual Load Modulating	90.9%
Percent Annual Load with Low-Load Cycling	%
Heat Pump Primacy Threshold	36
Annual Hours Primacy Cycling	2028
Percent Annual Load Primacy Cycling	23.9

Other Features

Cooling Load



Note: Cooling and heating data can be turned on and off. Data graph normally has cooling load data turned off.

Download and Save

- Download and save a PDF version of the data for the heat pump system that you selected

Back to List

Save PDF

Basic View ⓘ

Advanced Data - System Sizing

NEEP ccASHP Listed

Mitsubishi Electric Smart Multi
Central Air Conditioning Heat Pump (HP)
Multizone Mix of Ducted and Non-Ducted
AHRI Cert #: **211016454**
Outdoor Unit Model #: **MXZ-SM42NAMHZ2**
Indoor Model #:

- 🔥 Maximum Heating Capacity (Btu/h) @5°F: **44,000**
- 🔥 Rated Heating Capacity (Btu/h) @47°F: **48,000**
- ❄️ Rated Cooling Capacity (Btu/h) @95°F: **42,000**

This tool is for preliminary product selection planning only. It is necessary to conduct full engineering capacity assessments that take line-length, multi-head impacts, and other factors into consideration. Use manufacturer's data and tools to finalize product sizing and selection determinations.

ZipCode	Heating Design Temp. (°F) ⓘ	Cooling Design Temp. (°F) ⓘ
<input type="text" value="12801"/>	<input type="text" value="-2"/>	<input type="text" value="85"/>
Weather Station ⓘ	Heating Design Load (Btu/h) ⓘ	Cooling Design Load (Btu/h) ⓘ
<input type="text" value="Floyd Bennet Memorial, Winter Design"/>	<input type="text" value="42000"/>	<input type="text" value="7500"/>

Advanced Search - Sizing for Heating and Cooling User Guide ⓘ and Design Load Calculators

[Click here for Optional Settings](#)

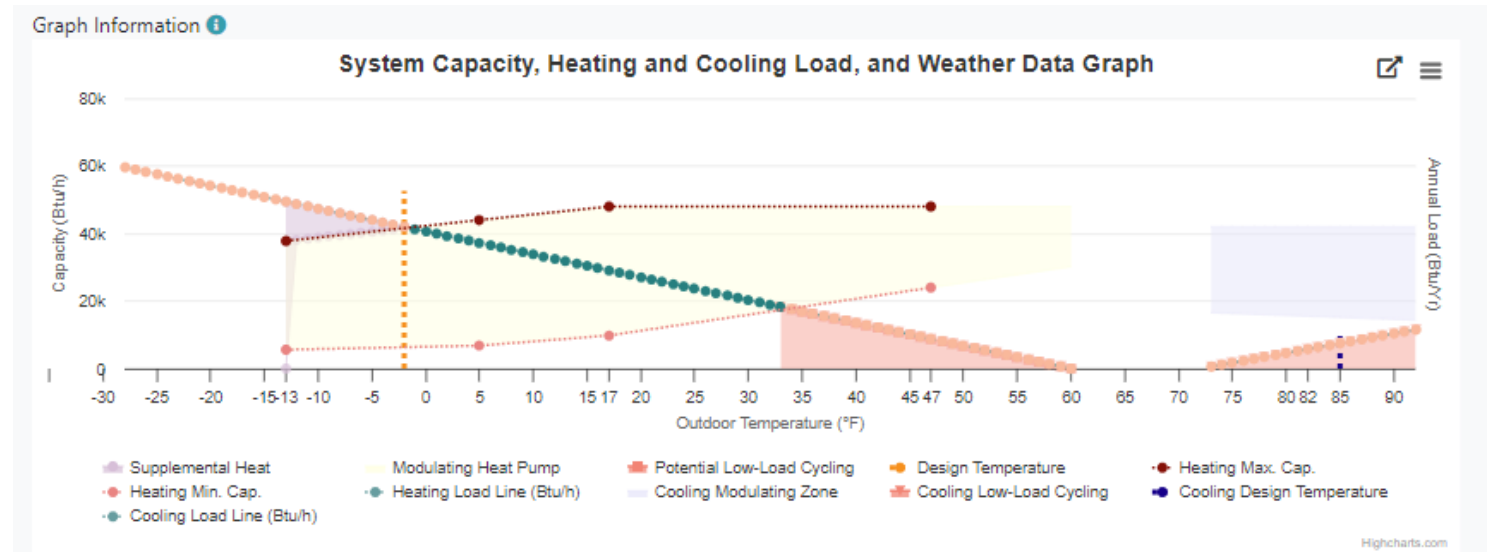
Run System Sizing

Graph Information ⓘ

System Capacity, Heating and Cooling Load, and Weather Data Graph

Basic View

- Changes the graphically displayed information to a simpler version that can be used to show customers.



www.CleanHeatConnect.ny.gov

Clean Heat Connect

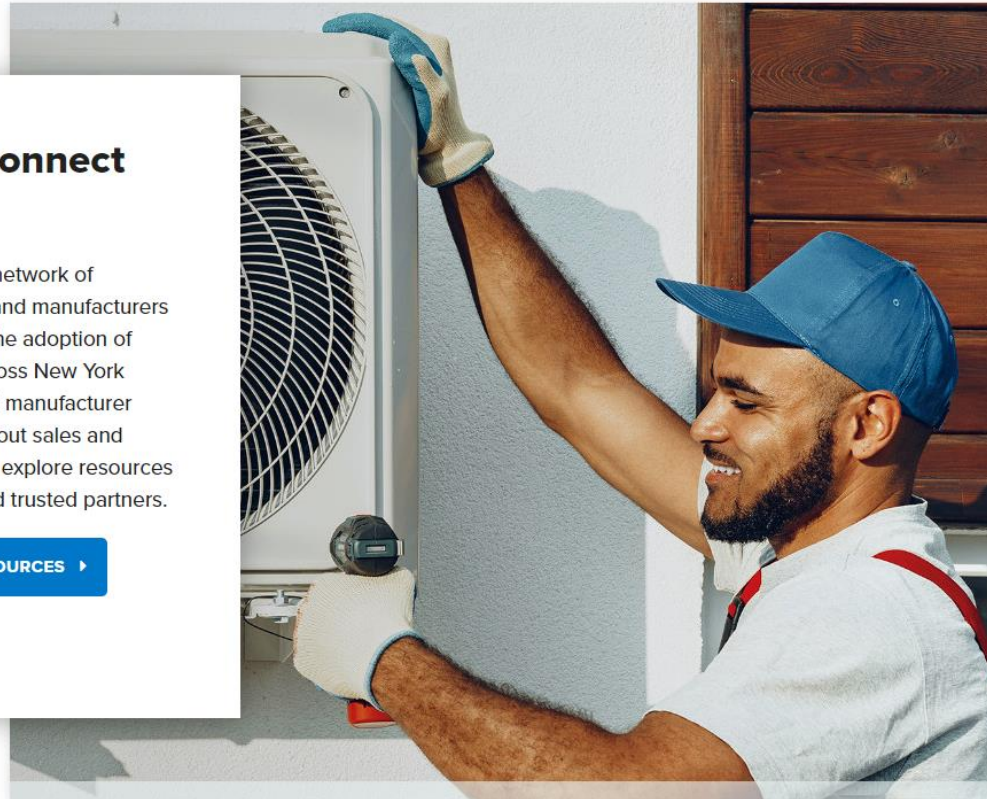
RESOURCES

TRAININGS

Clean Heat Connect

Clean Heat Connect is a network of contractors, distributors, and manufacturers dedicated to expanding the adoption of heat pumps in homes across New York State. Find distributor and manufacturer hosted trainings, learn about sales and marketing strategies, and explore resources from NYSERDA, NEEP and trusted partners.

[VIEW ALL INSTALLER RESOURCES ▶](#)



Thank You

JJ Sawicki

JSawicki@trccompanies.com

CleanHeatConnect@trccompanies.com



NYSERDA