EEBA
Energy & Environmental Building Alliance

PUMP UP THE AIR FLOW

GET YOUR HEAT PUMPS COMMISSIONED

Dan Wildenhaus
Senior Technical Manager - Training and Consulting Services,
Center for Energy & Environment

Bill Graber
Partner, The Energy Conservatory

Presenters

Dan Wildenhaus
Senior Technical Manager - Center for Energy & Environment

As a Technical Advisor, trainer, and consultant for residential, multifamily, and small business programs Dan has completely immersed in the discussion of what is required to create High Performance Buildings and the technologies that operate within them.

A former contractor, Dan currently provides Decarbonization and HVAC consultation, technical management, market channel development, and training and presentation services for a variety of programs across the country.

Bill Graber
The Energy Conservatory

Bill is a partner at TEC, joining in 2019. He previously worked at Emerson on pressure and flow measurements for over 25 years in engineering, business development, and strategic planning roles.

Bill has 3 patents related to flow measurement and holds a B.S. in Mechanical Engineering and an MBA from the University of Minnesota.

Learning Objectives

1. Prioritize which performance tests make sense to pursue on every project.
2. The difference between ENERGY STAR contractor requirements and a HERS Rater.
3. Have an outline of what the first skills your staff and trade partners should learn to quickly contribute to heat pump success.
4. Top 5 things to communicate to a homeowner about heat pumps to avoid complaints and frustration.

Discussion Outline

1. Background on Energy Star program incentives and how they are supported
2. What does it mean to have success with Heat Pumps?
    1. Role of Building Envelope
    2. HVAC Contractor commissioning process
3. Have an outline of what the first skills your staff and trade partners should learn to quickly contribute to heat pump success.
4. Top 5 things to communicate to a homeowner about heat pumps to avoid complaints and frustration.

Drivers for Heat Pumps

- **Money!**
- **Compliance**
- **Benefit (Ratings)**
- **“In the news”**
- **Carbon footprint**

Money

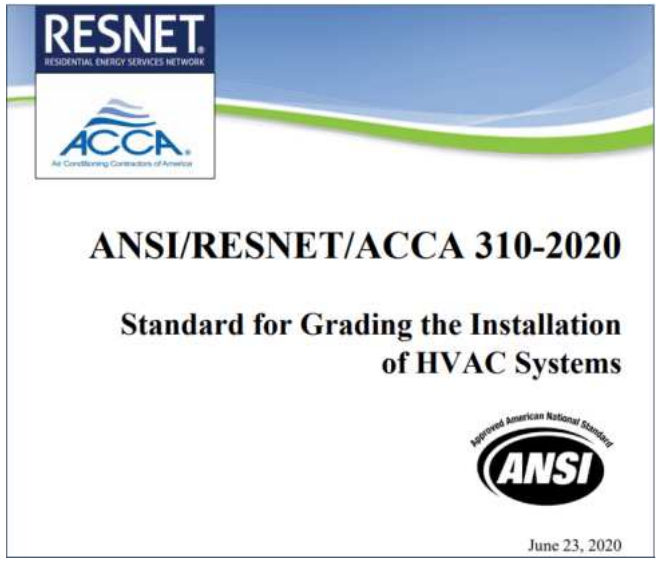
- Utility Programs
- Tax Credits
- IRA Programs
- Efficiency lending products

Utilities commonly to require “Quality Installation” as minimum or bonus
New Con programs typically aligned with ENERGY STAR, ENERGY STAR NextGen, DOE ZERH, or similar program

25C = Existing Homes
Requires CEE highest, non-advanced tier heat pump
CEE recommends full commissioning
45L = New Homes
Requires alignment with ENERGY STAR, ENERGY STAR NextGen, or DOE ZERH
Which require Standard 310

HOMES
Modeled savings, typically ENERGY STAR or higher equipment
States recommending or requiring “Quality Installation”
HEAR
Equipment incentives, requires ENERGY STAR
States may choose to require “Quality Installation”

What determines a Quality Install?



https://quality-install-tool.pnnl.gov/

ENERGY STAR New Homes

ENERGY STAR Single-Family New Homes
National Program Requirements, Version 3.2 (Rev. 13)

Exhibit 1: ENERGY STAR Reference Design Home [10]

The ENERGY STAR Reference Design Home is the set of efficiency features modeled to determine the ENERGY STAR ERI Target for each home pursuing certification. Therefore, while the features below are not mandatory, if they are not used then other measures will be needed to achieve the ENERGY STAR ERI Target. In addition, note that the Mandatory Requirements for All Certified Homes, Exhibit 2, contain additional requirements such as total duct leakage limits, minimum allowed insulation levels, and minimum allowed fenestration performance. Therefore, EPA recommends that partners review the documents in Exhibit 2 prior to selecting measures.

Hot and Mixed Climates (2021 IECC Zones 1,2,3,4A,4B) [11]	**Cold Climates** (2021 IECC Zones 4C,5,6,7,8) [11]
Cooling Equipment (Where Provided)	
• Cooling equipment modeled at the applicable efficiency levels below:	
○ ENERGY STAR AC: 16 SEER ○ Heat pump (See Heating Equipment)	○ AC: 14 SEER ○ Heat pump (See Heating Equipment)
• Installation quality modeled at -20% blower fan airflow deviation, 0.52 W / CFM blower fan efficiency, and Grade III refrigerant charge	
Heating Equipment	
• Heating equipment modeled at the applicable efficiency levels below, dependent on fuel and system type:	
○ Gas furnace: CZ 1-3: 80 AFUE; CZ 4A & 4B: 90 AFUE [11] ○ Gas boiler: CZ 1-3: 80 AFUE; CZ 4A & 4B: 90 AFUE [11]	○ ENERGY STAR gas furnace: 95 AFUE ○ ENERGY STAR gas boiler: 95 AFUE
○ ENERGY STAR air-source heat pump: 9.2 HSPF / 16 SEER	○ ENERGY STAR air-source heat pump: 9.2 HSPF / 16 SEER
• Installation quality modeled at -20% blower fan airflow deviation; 0.52 W / CFM blower fan efficiency; and, as applicable, Grade III refrigerant charge	

ENERGY STAR Single-Family New Homes
National Rater Design Review Checklist, Version 3 / 3.1 / 3.2 (Rev. 13)

If pursuing Track A - HVAC Grading, complete this page. [1]

Home Address: _____ City: _____ State: _____ Permit Date: _____

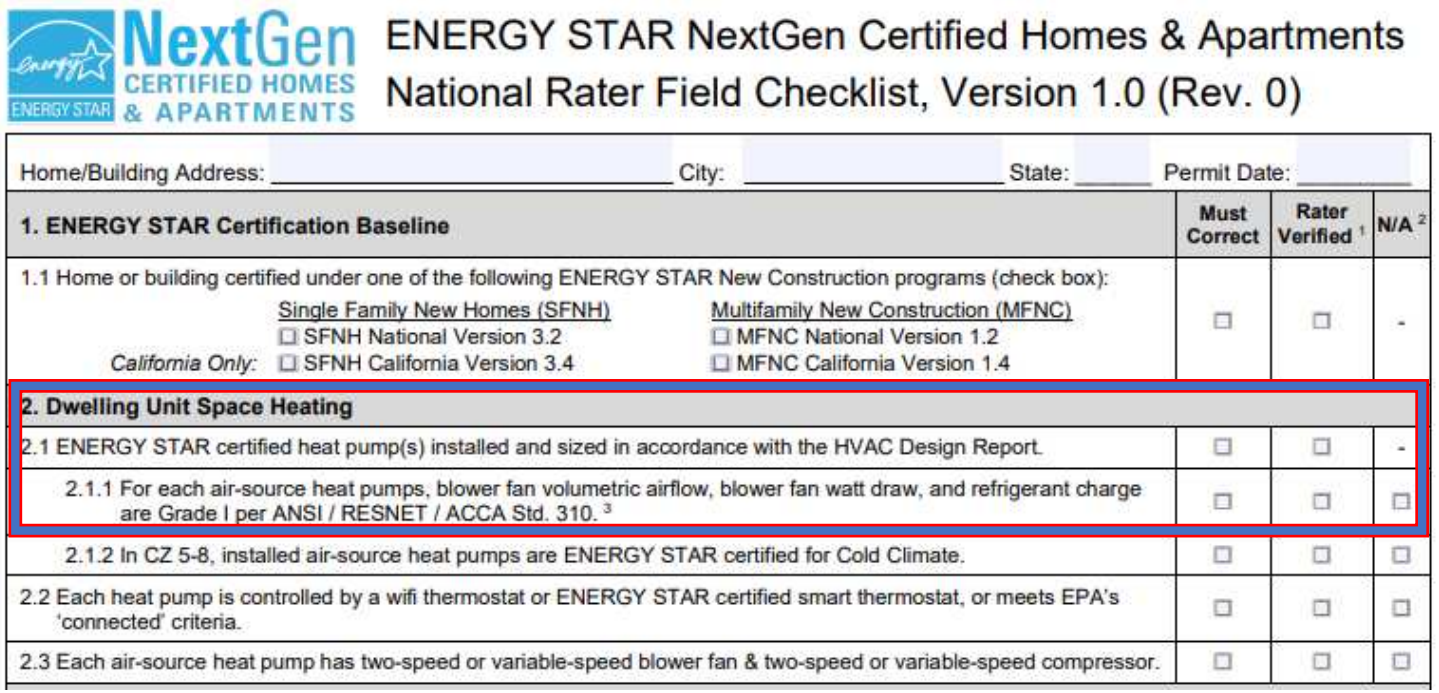
1. Partnership Status	**Must Correct**	**Rater [2] Verified**	**N/A [3]**
1.1 Rater has verified and documented that builder has an ENERGY STAR partnership agreement using www.energystar.gov/ResPartnerDirectory. [4]	☐	☐	-
1.2 Rater has verified and documented that their company has an ENERGY STAR partnership agreement using www.energystar.gov/ResPartnerDirectory. [5]	☐	☐	-
1.3 Rater(s) signing checklists attest that they have completed EPA-recognized training and are credentialed by a Home Certification Organization (HCO).	☐	☐	-
2. High-Performance Fenestration			
2.1 Specified fenestration meets or exceeds 2009 IECC or, for National v3.2, 2021 IECC requirements. [6, 7]	☐	☐	-
3. High-Performance Enclosure			
3.1 Specified total building thermal envelope UA achieves ≤ 100% of the total UA resulting from the U-factors in 2009 IECC Table 402.1.2 or, for National v3.2, 2021 IECC Table 402.1.2. See exception in Fn. 8. [7,8,9,10]	☐	☐	☐
4a. Review of ANSI / RESNET / ACCA / ICC 310 HVAC Design Report with ENERGY STAR Supplement [11]			
4a.1 HVAC design report compliant with ANSI / RESNET / ACCA / ICC 310, and the National HVAC Design Supplement to Std. 310 for Dwellings & Units, collected for records, with no applicable Items left blank. [12]	☐	☐	-
4a.2 ANSI / RESNET / ACCA / ICC 310 design review criteria have been met for applicable housing type.	☐	☐	-
4a.3 Cooling sizing % is within the cooling sizing limit selected by the HVAC designer.	☐	☐	☐

Rater Name: _____ Date of Review: _____

Rater Signature: _____ Rater Company Name: _____

ENERGY STAR NextGen Certified Homes

- Must meet ENERGY STAR version appropriate for location
- Must have a Rater perform the National Rater Field Checklist for NextGen Certified Homes



NextGen CERTIFIED HOMES & APARTMENTS

ENERGY STAR NextGen Certified Homes & Apartments
National Rater Field Checklist, Version 1.0 (Rev. 0)

Home/Building Address: _____ City: _____ State: _____ Permit Date: _____

1. ENERGY STAR Certification Baseline	Must Correct	Rater Verified [1]	N/A [2]
1.1 Home or building certified under one of the following ENERGY STAR New Construction programs (check box): Single Family New Homes (SFNH) — Multifamily New Construction (MFNC) ☐ SFNH National Version 3.2 — ☐ MFNC National Version 1.2 *California Only:* ☐ SFNH California Version 3.4 — ☐ MFNC California Version 1.4	☐	☐	-
2. Dwelling Unit Space Heating			
2.1 ENERGY STAR certified heat pump(s) installed and sized in accordance with the HVAC Design Report.	☐	☐	-
2.1.1 For each air-source heat pumps, blower fan volumetric airflow, blower fan watt draw, and refrigerant charge are Grade I per ANSI / RESNET / ACCA Std. 310. [3]	☐	☐	☐
2.1.2 In CZ 5-8, installed air-source heat pumps are ENERGY STAR certified for Cold Climate.	☐	☐	☐
2.2 Each heat pump is controlled by a wifi thermostat or ENERGY STAR certified smart thermostat, or meets EPA's 'connected' criteria.	☐	☐	☐
2.3 Each air-source heat pump has two-speed or variable-speed blower fan & two-speed or variable-speed compressor.	☐	☐	☐

DOE Zero Energy Ready Homes

U.S. DOE Zero Energy Ready Home
Single Family Homes National Program Requirements
Version 2 (Rev. 1)

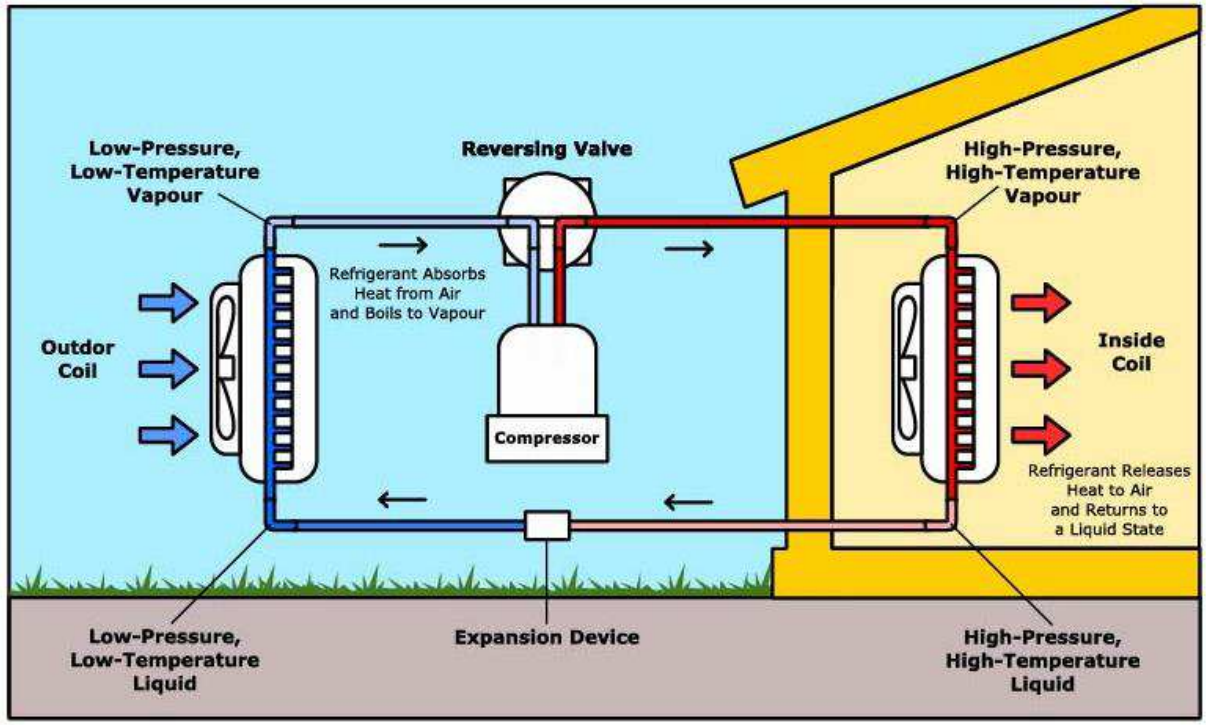
Exhibit 2: DOE Zero Energy Ready Home Target Home [37]

HVAC Equipment[38]			
	Very Hot & Hot Climates (2021 IECC Climate Zones 1,2)	**Warm & Mixed Climates** (2021 IECC Climate Zones 3, 4A, 4B)	**Cold & Very Cold Climates** (2021 IECC Climate Zones 4C, 5,6,7,8)
Furnace AFUE	80%	CZ3: 92%; CZ4: 95%	95%
SEER	18	16	16 (ASHP); 14 (A/C)
HSPF	9.2	9.2	9.5
Boiler AFUE	80%	CZ3: 92%; CZ4: 95%	95%
Whole-House Mechanical Ventilation System Efficiency	2.9 cfm/W no heat exchange	2.9 cfm/W no heat exchange	1.2 cfm/W; balanced with heat exchange, 65% ASRE
HVAC Grading			
• **Airflow Deviation:** Grade I, -7.5%	• **Watt Draw Efficiency**: Grade I, 0.45 W/cfm	• **Refrigerant Grade** (as applicable): Grade III	

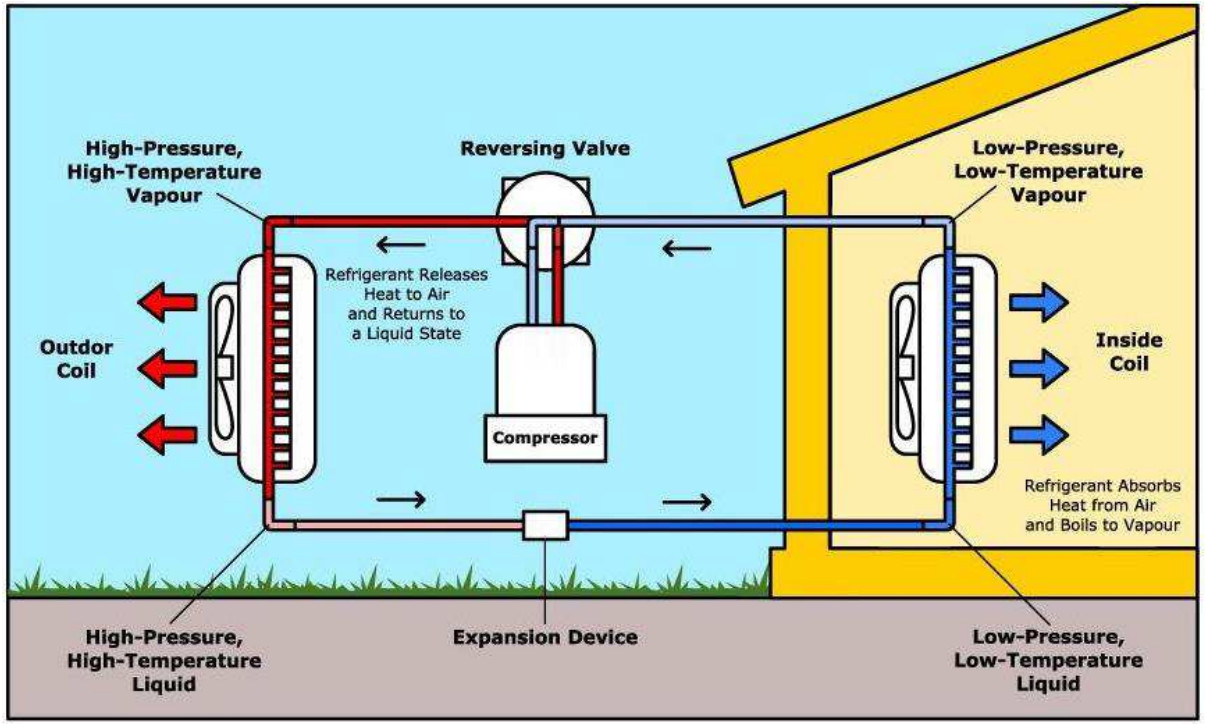
Air Source Heat Pump Operation

Source: DOE Energy Star

Heating Cycle



Cooling Cycle

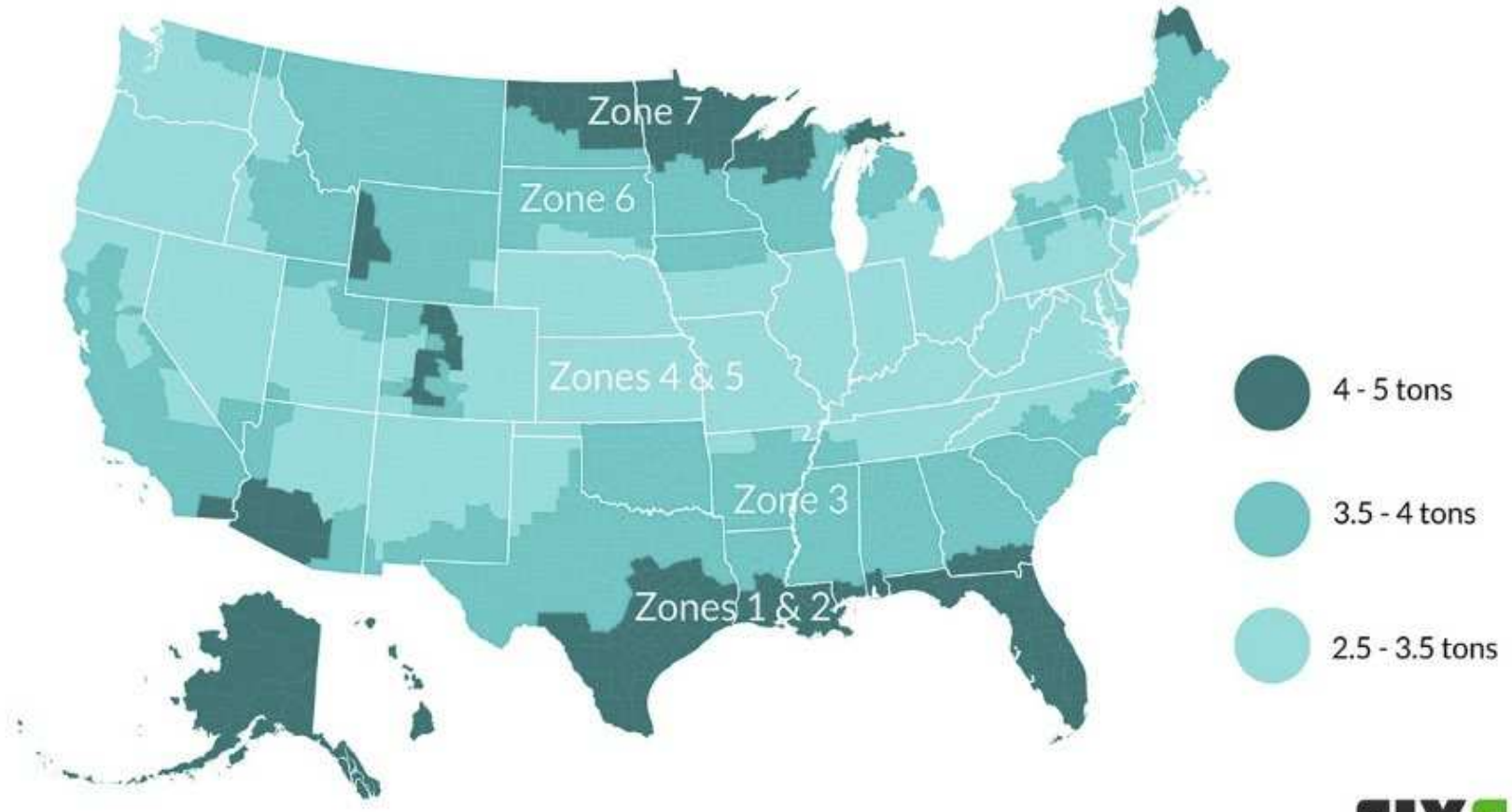


Selecting Heat Pump can be Over-simplified

Success Factors

- **Comparable Initial Cost**
- **Comparable Comfort**
- **Comparable Operating Cost**
- **Reduce Energy CO2 Consumption**
- **Comparable Durability**

To heat and cool a 2,000 sq.ft. home in each zone, you need the following sized heat pumps:

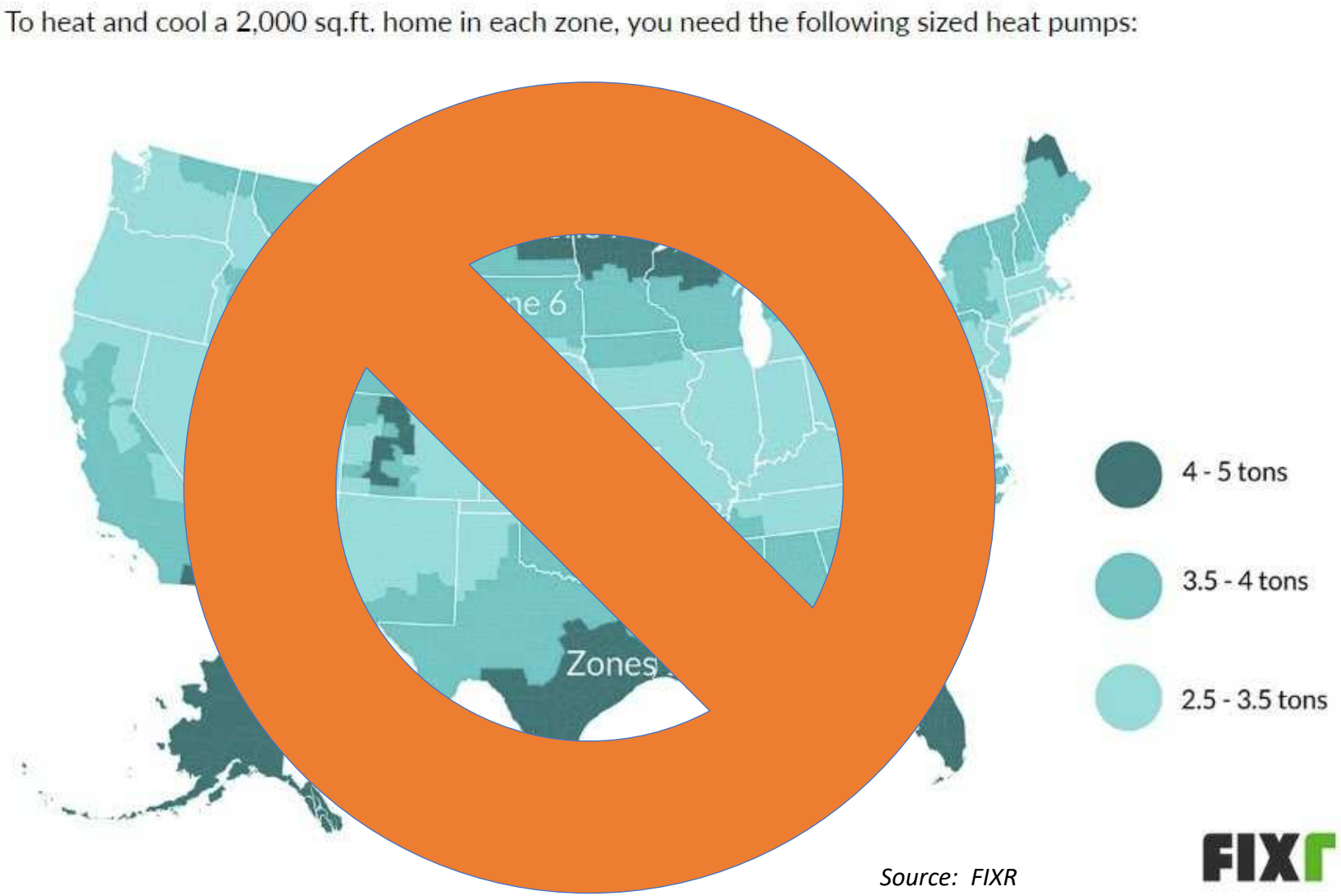


Source: FIXR

Source: FIXR

Selecting Heat Pump can be Over-simplified

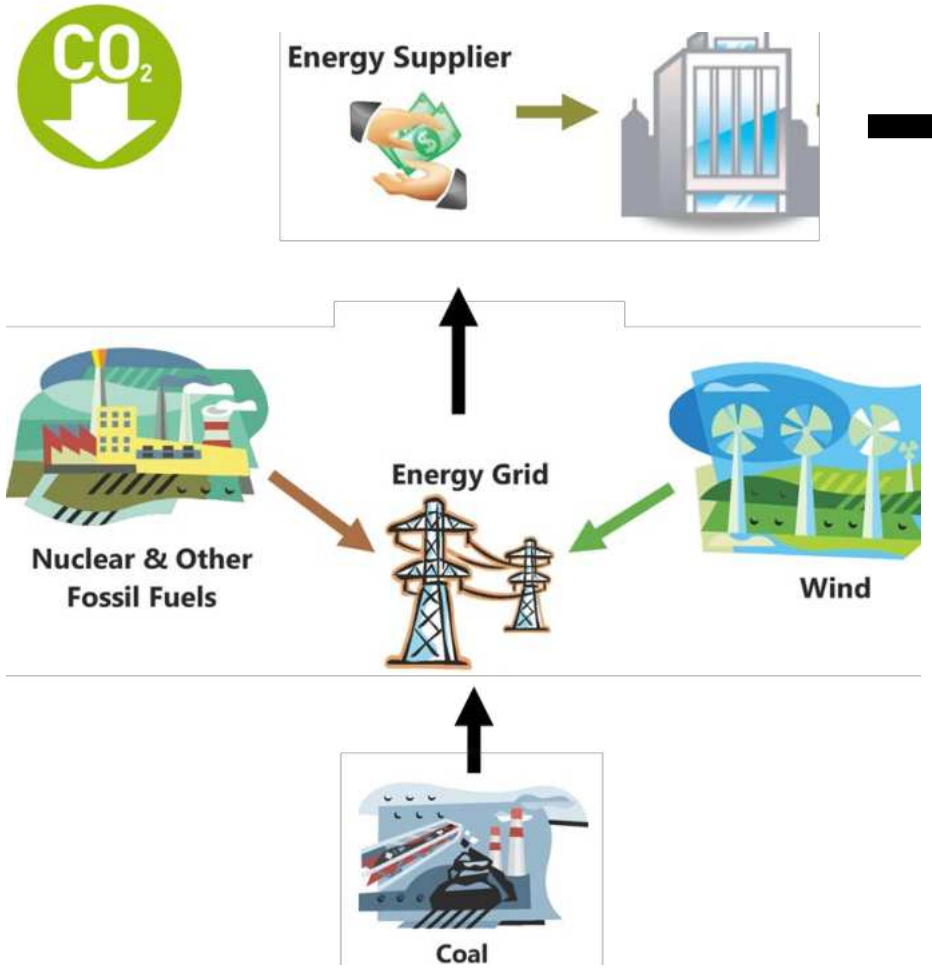
Success Factors
Comparable Initial Cost
Comparable Comfort
Comparable Operating Cost
Reduce Energy CO2 Consumption
Comparable Durability



Source: FIXR

What Does it Mean to Have Success?

Source: Energy.gov

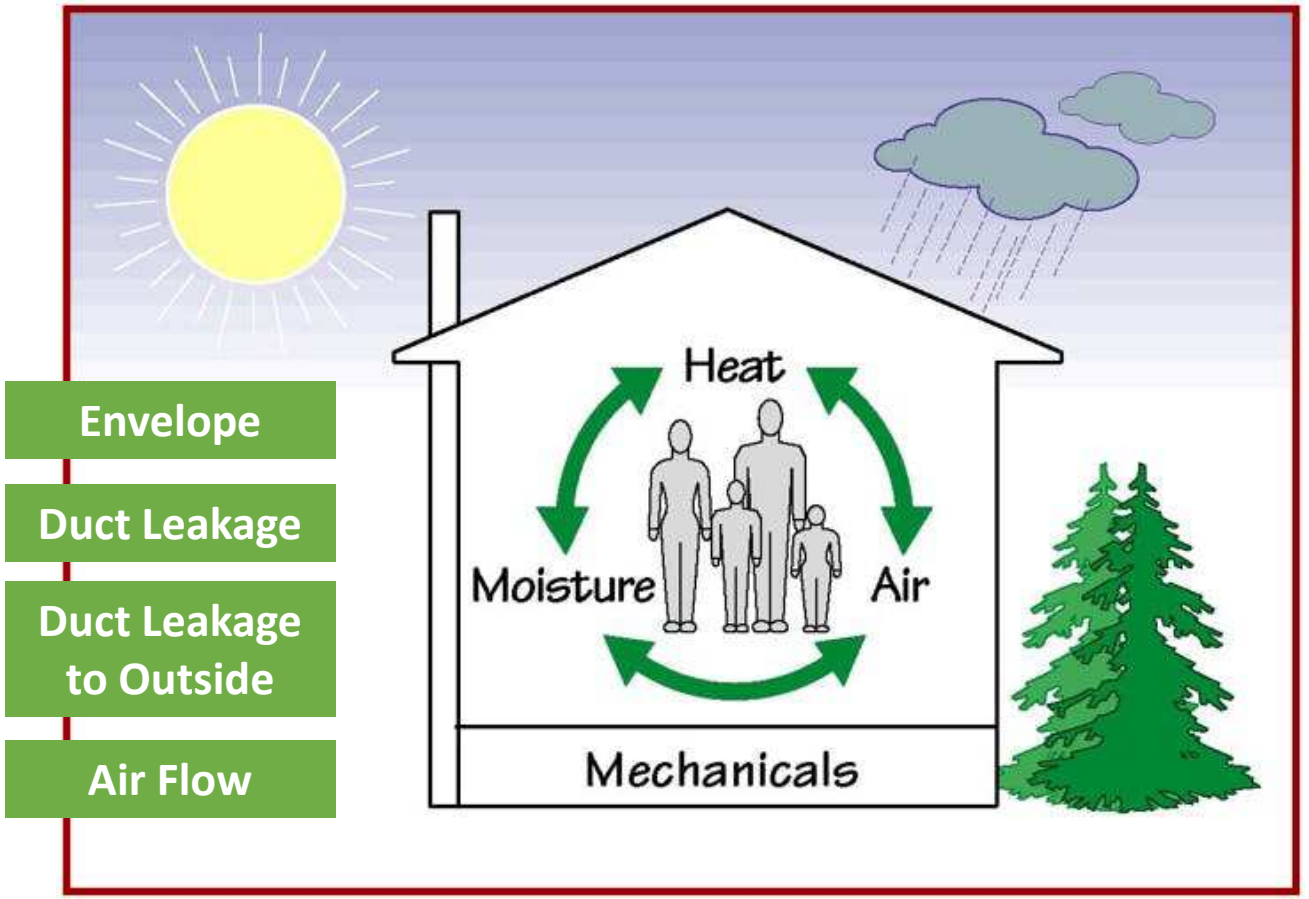


Homeowner/Contractor Goals

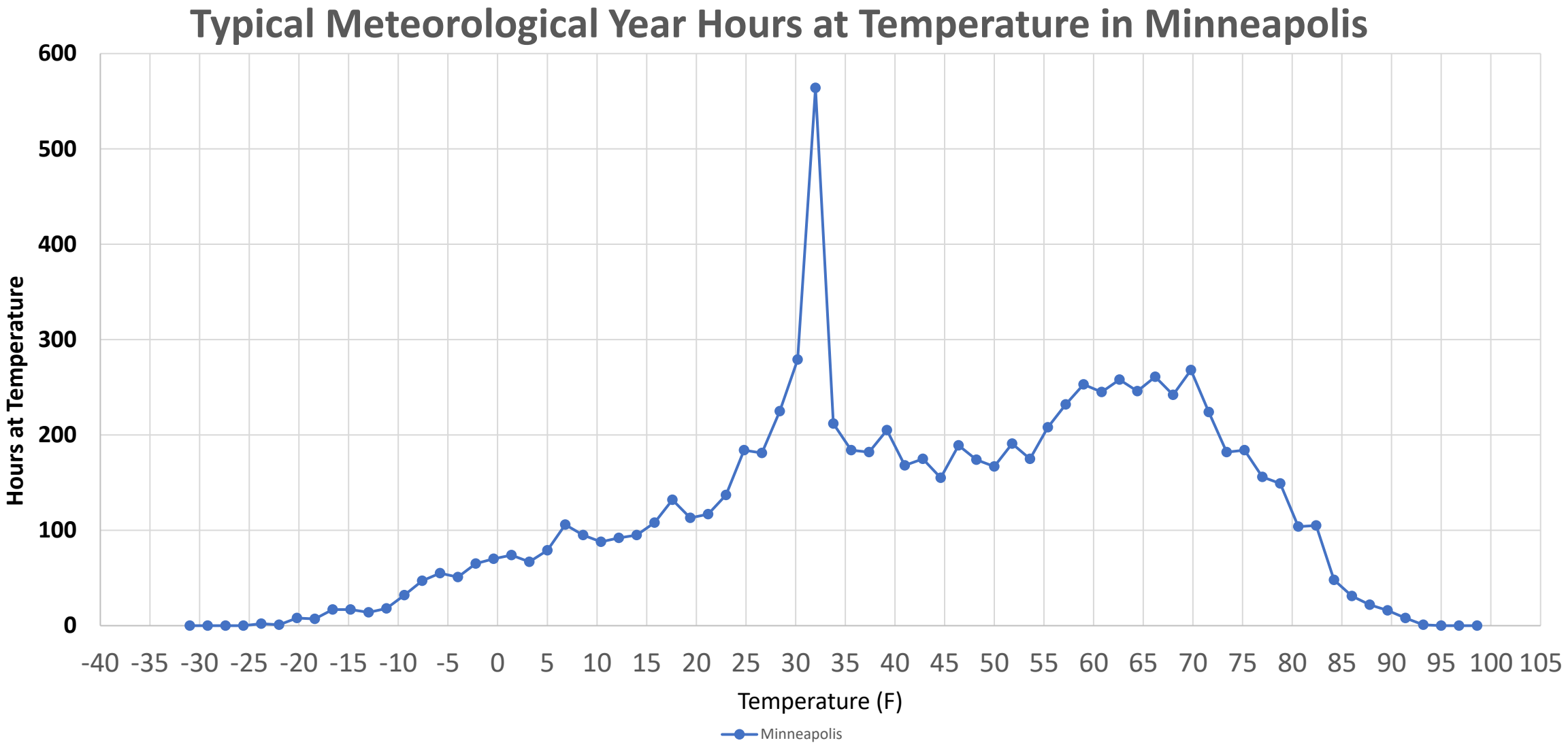
- Comparable Initial Cost
- Comparable Comfort
- Comparable Operating Cost
- Reduce Energy (Carbon) Consumption
- Comparable Expected Life / Durability

Systematic Approach Required for Success

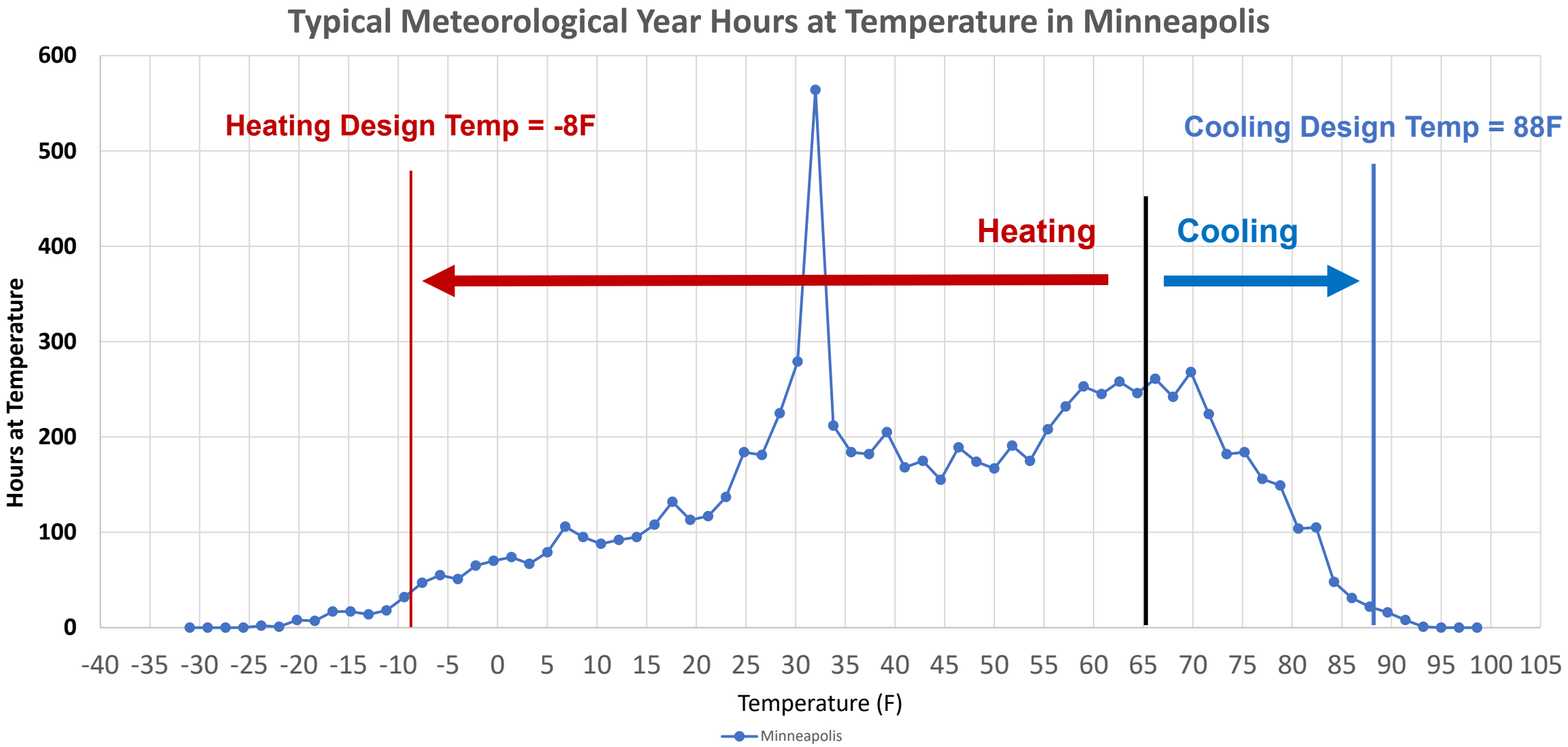
- Heat Pumps can help us achieve our goals to deliver comfortable, safe, healthy, efficient and durable homes.
- Success requires that the mechanical system is selected (Manual S, D) to support the load of the home (Man J).
- This means the building envelope, fresh air, ductwork and heat pump need to be commissioned to perform well together



Example Minneapolis House

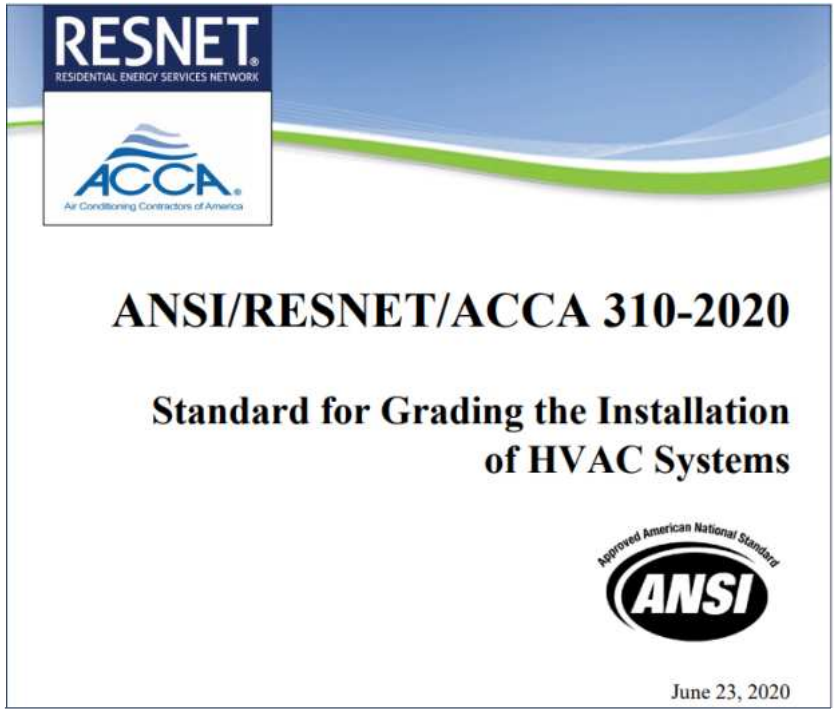


Example Minneapolis House

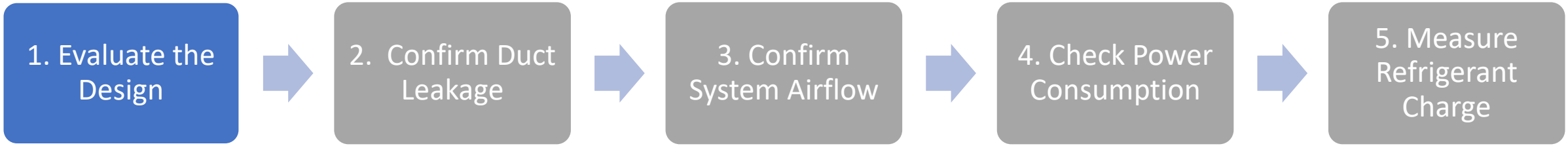


Ducted Heat Pumps
New Construction: HVAC Contractor Process Overview

1. Evaluate the Design
2. Confirm Duct Leakage
3. Confirm System Airflow
4. Check Power Consumption
5. Measure Refrigerant Charge



Ducted Heat Pump
New Construction: HVAC Contractor Process Overview



- **Energy Model**
  - Estimated Load
- **Tight Envelope has Significant Impact**

Example Minneapolis House

Let's Size a Heat Pump for Success!

Retrofit

- 1 Story, ~1500 Sq Ft Home
- 95% Gas Furnace, 2-ton AC

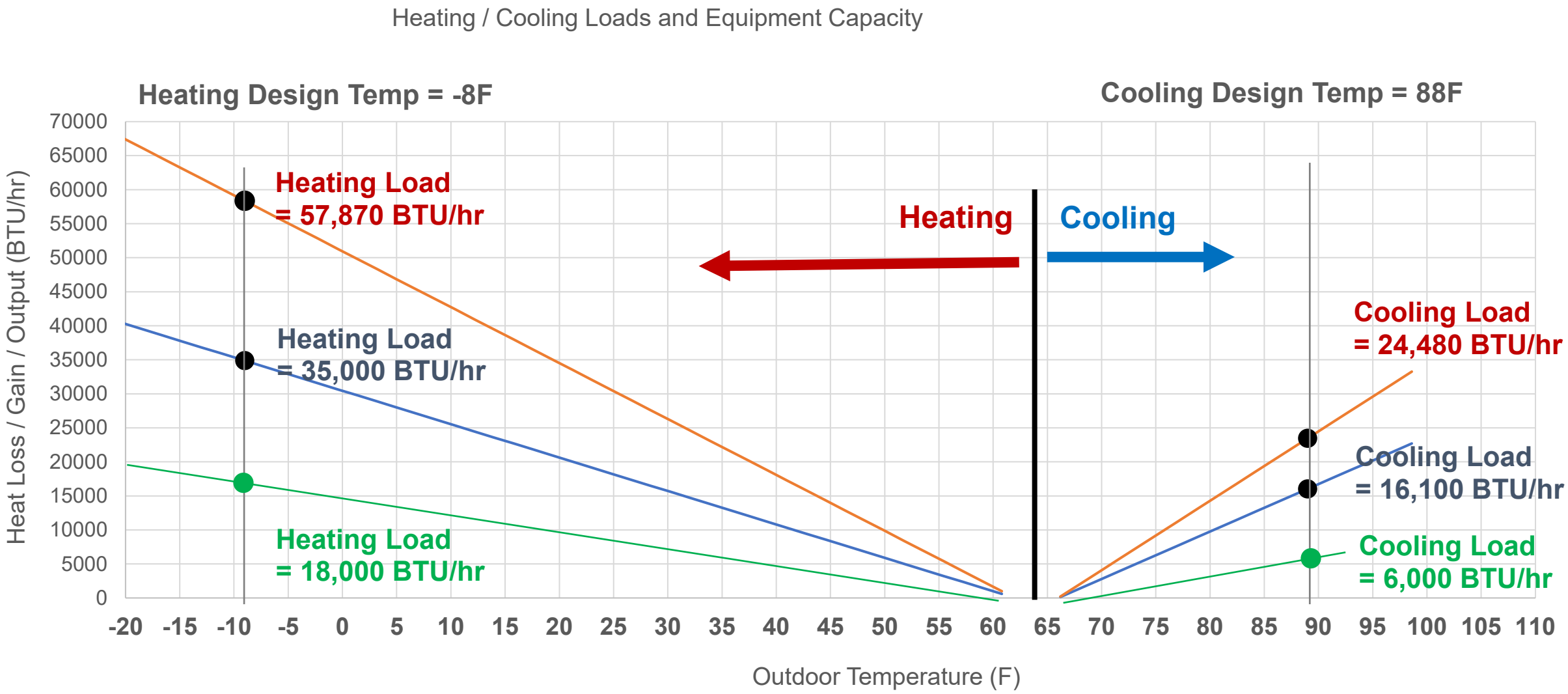
Success Factors

- **Comparable Initial Cost**
- **Comparable Comfort**
- **Comparable Operating Cost**
- **Reduce Energy CO2 Consumption**
- **Comparable Durability**

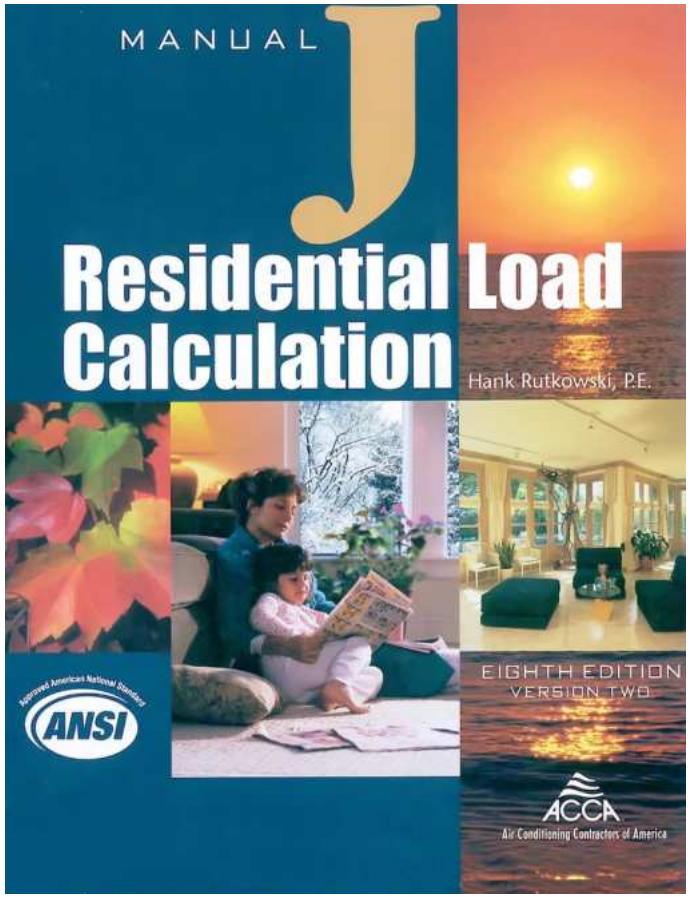
- **Envelope**
- **Duct Leakage**
- **Duct Leakage to Outside**
- **Air Flow**

Versions	Envelope	HVAC TESP	HVAC Air Flow (heat)	Duct Leakage to Outside
Very Tight Home	1 ACH50	0.5 inH2O	600 cfm	0%
Tight House	2 ACH50	0.5 inH2O	1000 cfm	0%
Leaky House	11 ACH50	0.8 inH2O	900 cfm	8%

Benefits of Load Reduction Increase in Colder Climates



Manual J Load Calc Software



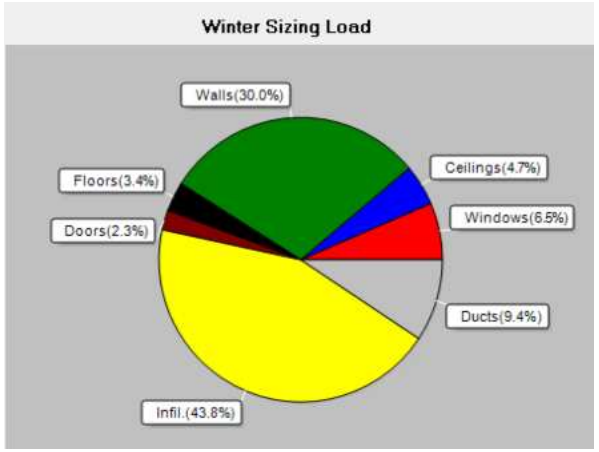
MiTek WRIGHTSOFT

KWIK MODEL3D

Cool Calc Manual J

Heating Design Temp = -8F
Cooling Design Temp = 88F

Winter Delta Temp. (°F)	78
Winter Building Load (Btuh)	
Window Load:	4142
Wall Load:	19063
Ceiling Load:	2970
Door Load:	1435
Floor Load:	2134
Infiltration Load:	27780
Building Subtotal	57524
Duct Loss:	5955
Mech Ventilation Loss:	0
TOTAL HEATING LOAD	63479



Manual J and Equivalent Approaches

ACCA Approved

Cool Calc Manual J

MiTek WRIGHTSOFT

Elite Software

EnergyGauge Energy and Economic Analysis Software

Amply Amp up your heat pump business

conduit tech

Equivalent – versions may/may not be ACCA Approved

HVAC SIZING TOOL

Free
Man-J v7 equivalent
No low-e, only SHGC

LoopCAD

HeatCAD

Canadian
F280 compliant
Not free

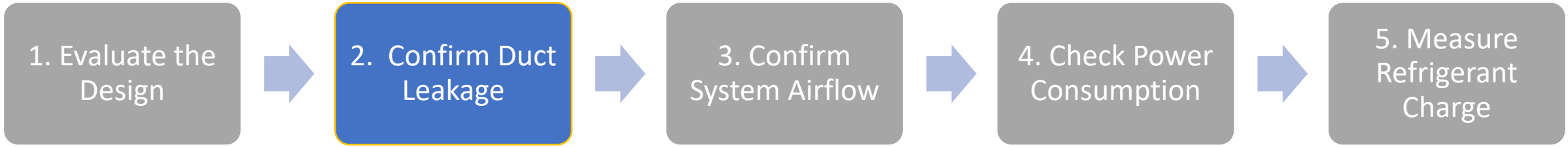
h2x

European
Getting ACCA approved
Great for hydronic

Updated Manual S sizing guidance Capacity vs Load

Equipment Type	Heating Size Limit	Cooling Size Limit
Single speed AC	NA	120%
Two Speed AC	NA	125%
SS and TS HPs	120%	120%
Fuel fired furnace/boiler	140%	NA
VCHP = Adv HP Dry Climate	150%	130%
Emergency/Back up ER	175%	NA

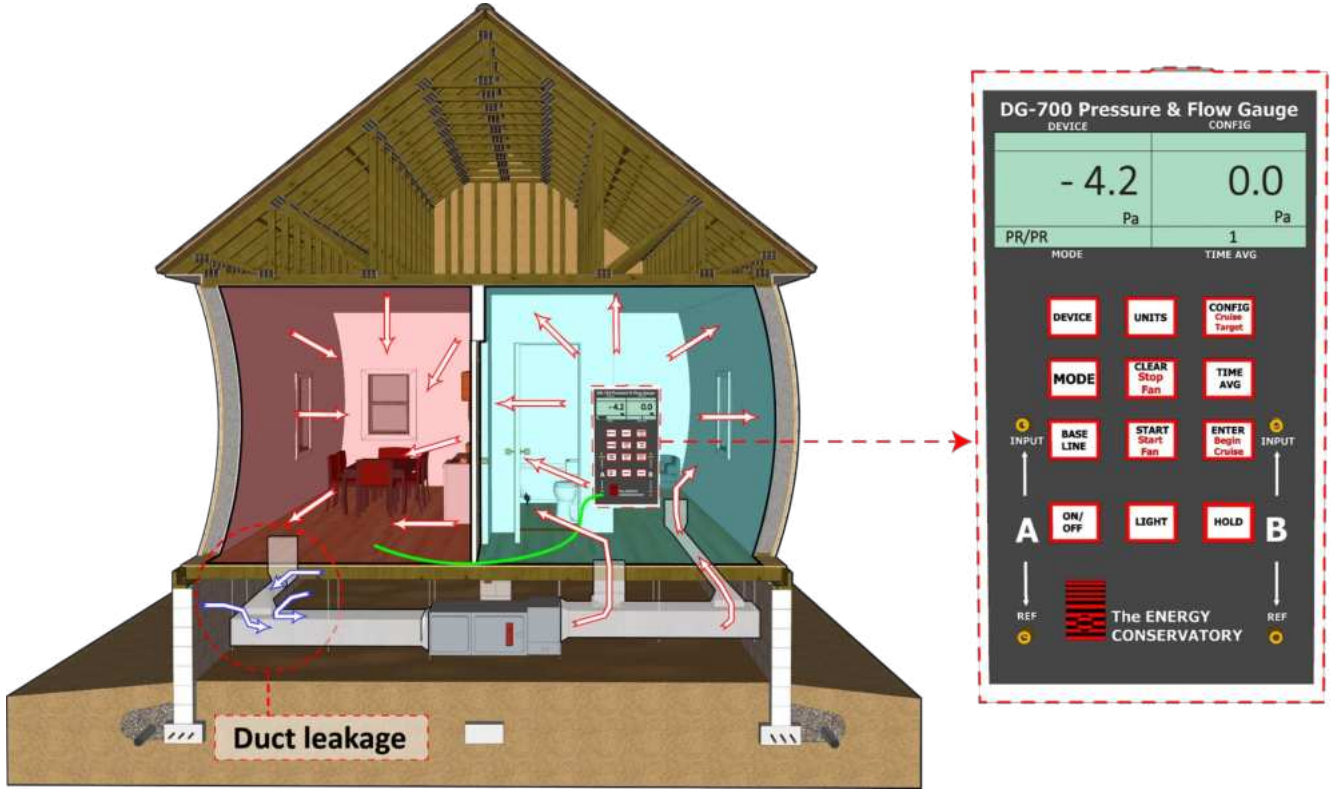
Ducted Heat Pump
New Construction: HVAC Contractor Process Overview



- Confirmed by Duct Leakage Test
- **Duct Leakage to Outside has Significant Impact**

When Does Duct Leakage Matter?

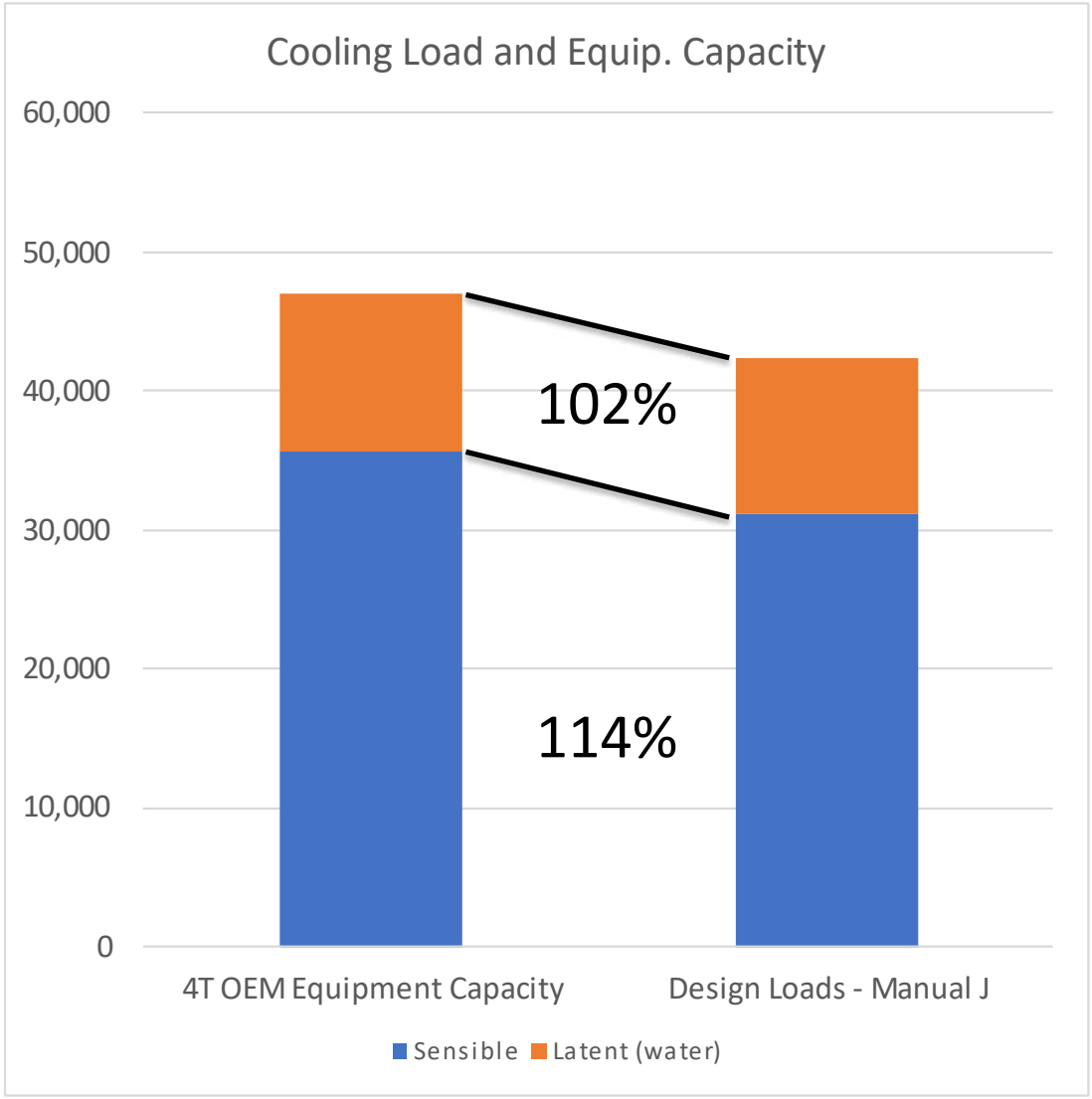
- The big concern is when there are ducts outside the envelope
- When they are – this is a BIG Concern…



MIAMI CASE STUDY – UNCOMFORTABLE HOME

Confirm Manual J Calc Results

Existing system is correctly sized – almost exactly



MIAMI CASE STUDY- DUCT LEAKAGE TO OUTSIDE

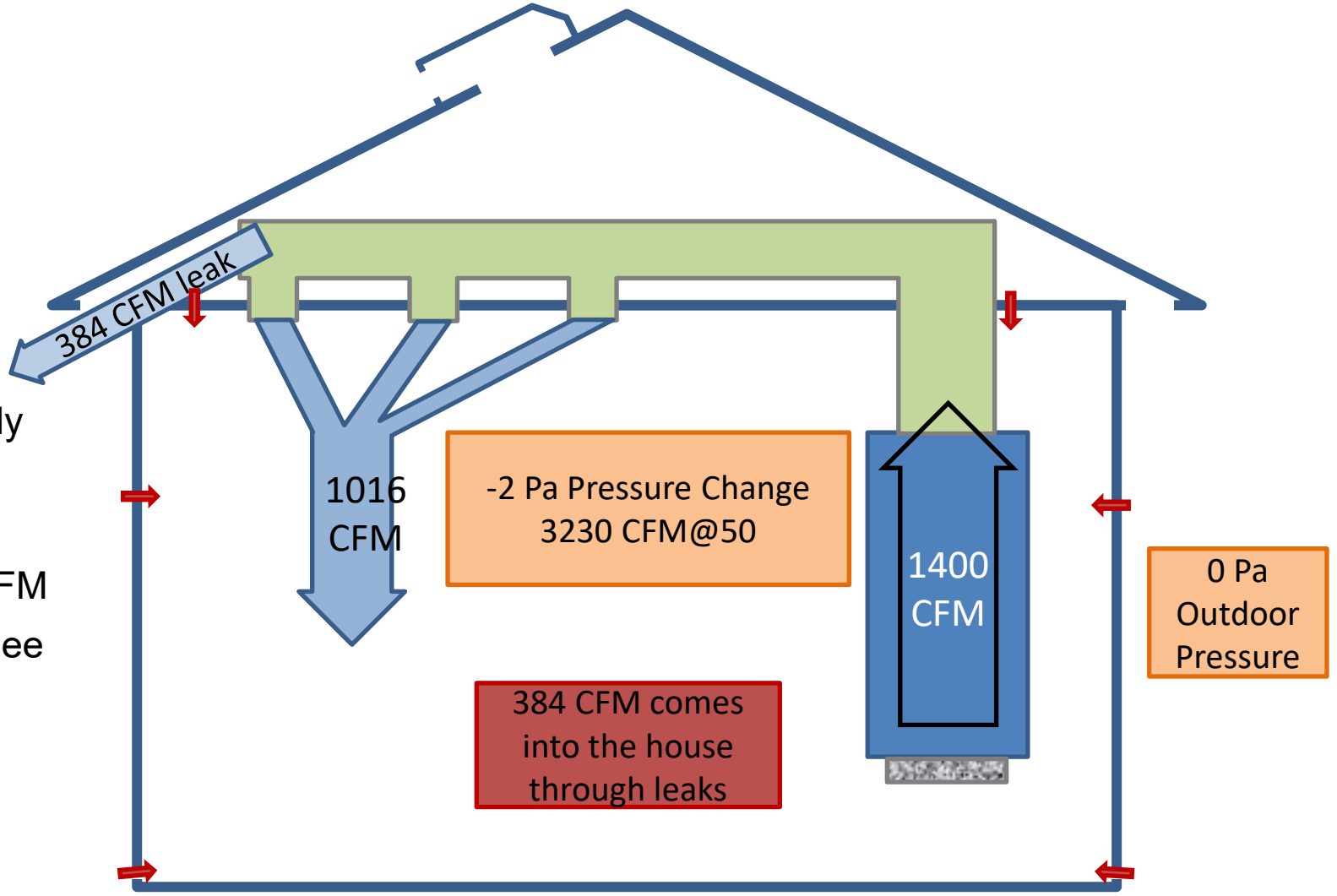
House depressurizing by 2Pa (0.008 inH2O) when HVAC is turned on

This is caused by duct leakage

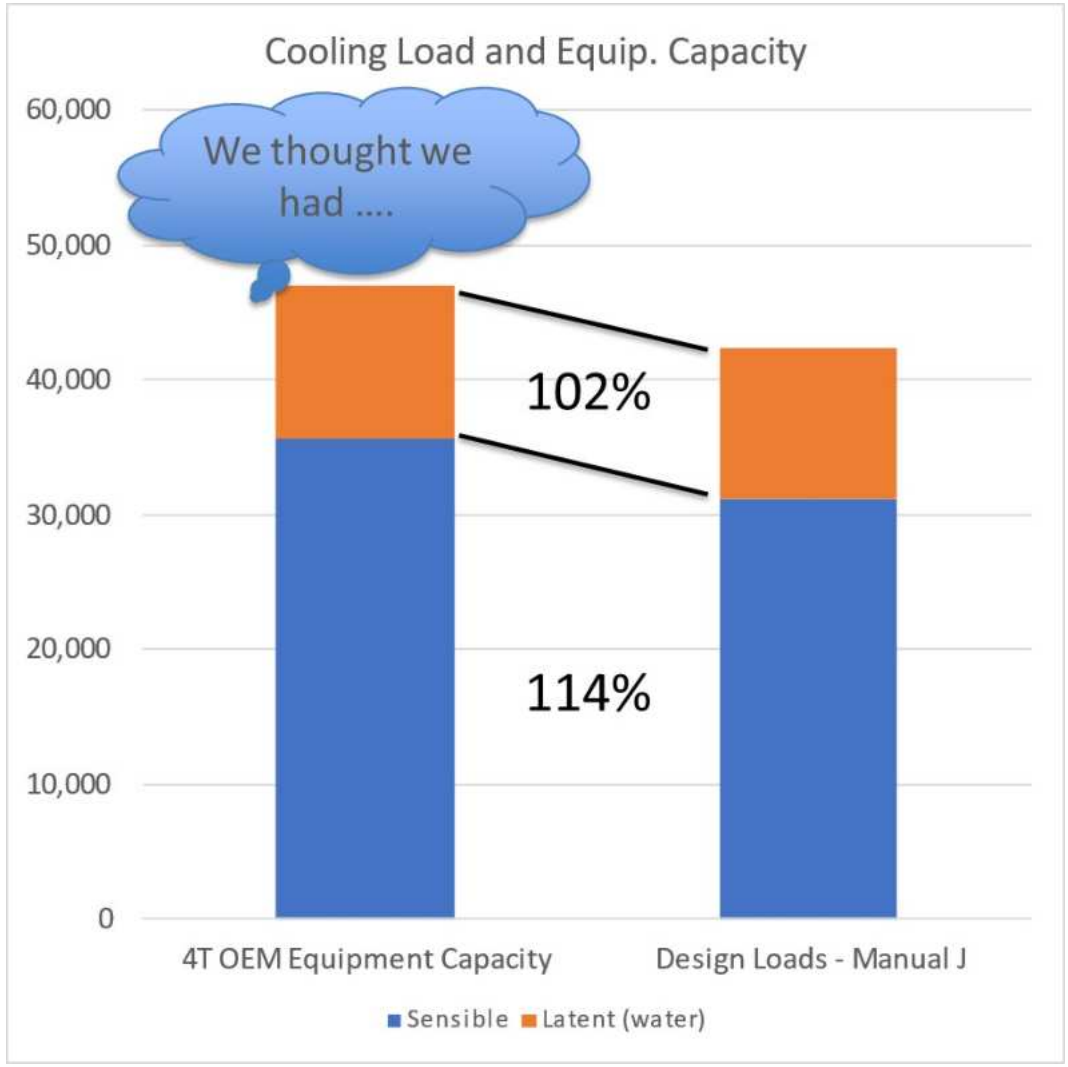
- Depressurizing means from Supply Duct

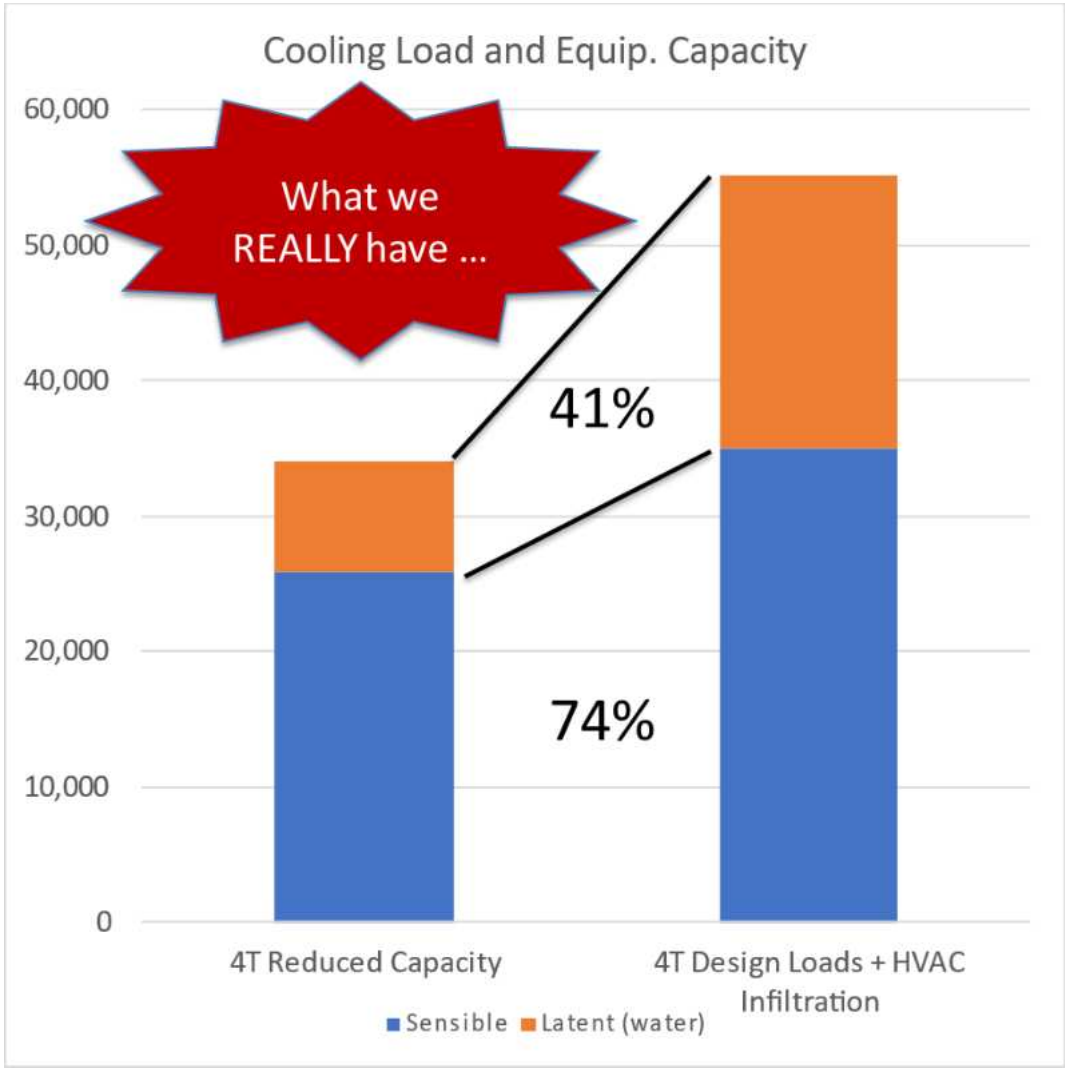
Resulting in <u>increase</u> in infiltration of ~280 CFM

- Based on Blower Door Test and See Stack estimate
- Goes from 102 to 384 CFM.

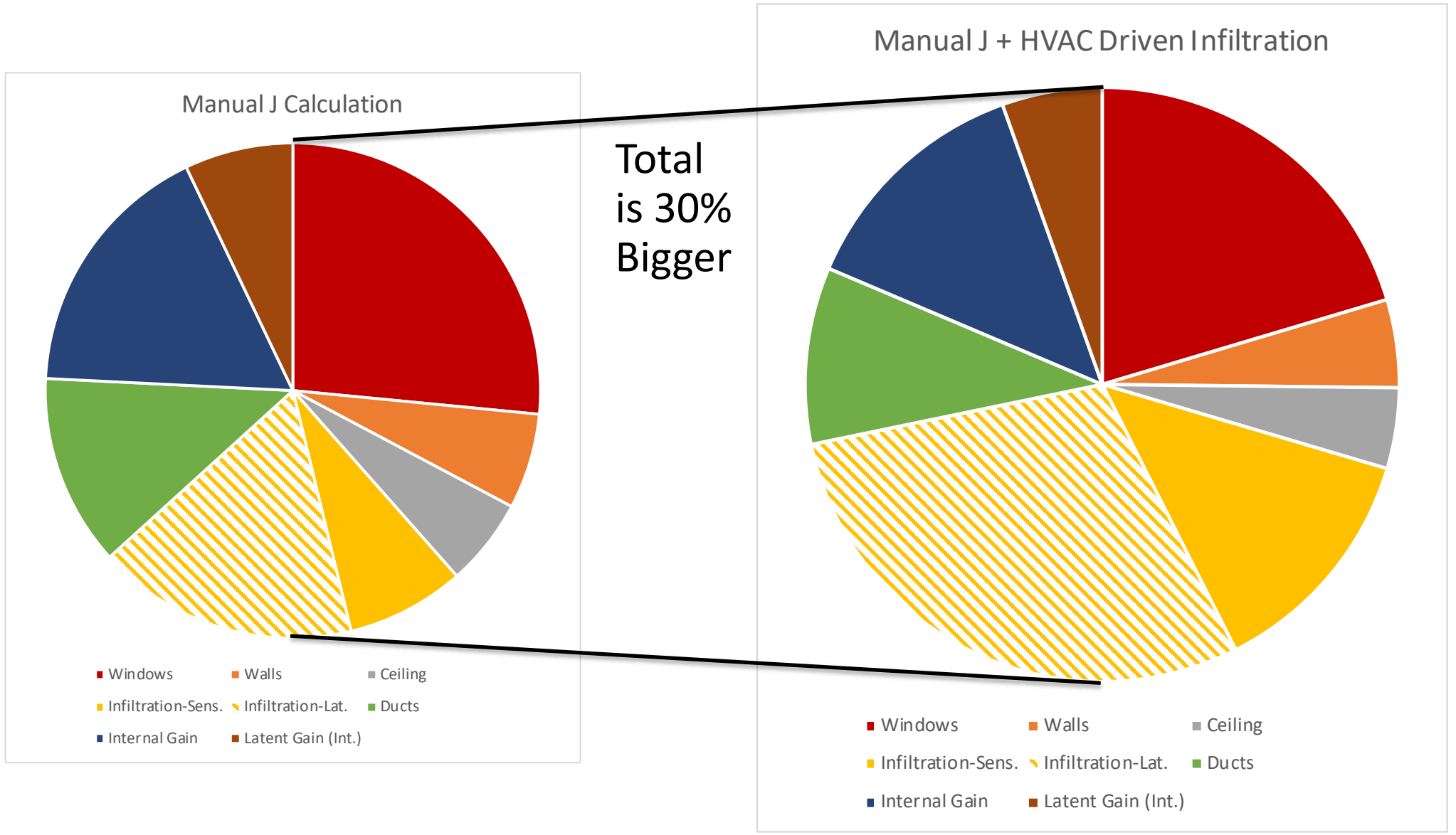


IS LEAKING 380 CFM A BIG DEAL –YES IT IS





How a Bad Duct Impacts the House Load



Ducted Heat Pump
New Construction: HVAC Contractor Process Overview

1. Evaluate the Design → 2. Confirm Duct Leakage → **3. Confirm System Airflow** → 4. Check Power Consumption → 5. Measure Refrigerant Charge

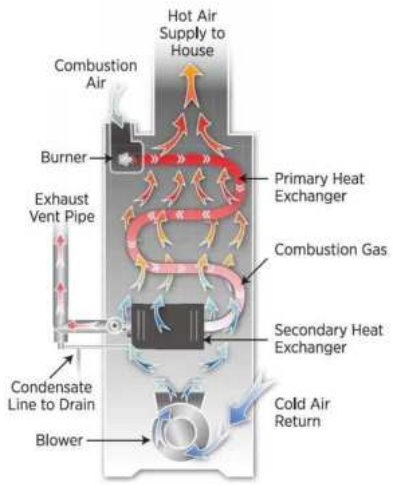
- Confirm system Air Flow with Flow Grid or another method
- **Heat Pumps in Heat mode will have Higher Air Flow requirements than Furnaces**
- **Air Flow impacts how much sensible and latent work is done by the system in cooling mode**

Heat Pumps Require Higher Air Flow than Furnaces in Heat Mode

Placeholder

95% Furnace

- 80,000 BTU
- Heat Rise = 35 – 50 F
- **Air flow = 800 cfm**
- **TESP = 0.8 inH2O**
- ~120 cfm/ton



But what if you compared the HP to a furnace + 5-ton AC?

5-ton Heat Pump

- Design Heat Rise = 20 – 30 F (Typically lower than gas furnace)
- Required air flow = 2000 cfm (Typically, requires ~400 cfm/ton)
- ECM motor will try to push 2000 cfm at 5 inH2O.
  - **Won't happen.**
  - More likely to reach ~1.5 inH2O (or so) which will deliver ~1100 cfm (220 cfm/ton)
  - May hit refrigerant high-pressure limit and shut down heat pump, moving to back-up heat.

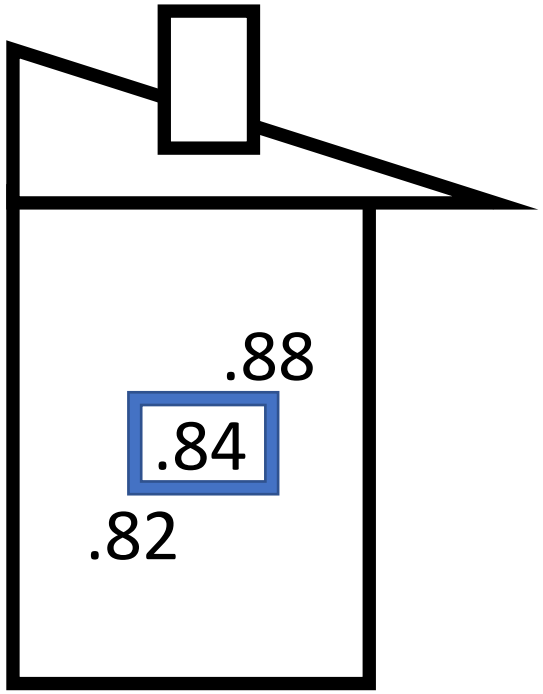
System Performance in Cooling Mode
Example: The Sensible Heat Ratio Of a Florida House

Load Calculation Worksheet						
Outdoor Design Conditions	Location	Outdoor RH%	Heating Dry Bulb		Cooling Dry Bulb	
	Orlando, FL	50	44		93	
Indoor Design Conditions	Location	Indoor RH%	Heating Dry Bulb		Cooling Dry Bulb	
	Johnny's	50	70		75	
Construction Materials with corresponding heat gains	U-value	R-value	(SUMMER)		(WINTER)	
			Heat Gain		Heat Loss	
			Latent	Sensible	Latent	Sensible
Internal gains						
People			230			
Appliance				1,800		
ETC.			186			
External Gains						
Walls		13	1,000	4,000		2,000
Roof		30	2,000	7,500		5,500
ETC.		13	1,000	5,000		2,000
windows	.05			7,500		5,000
Infiltration						
Blower Door			684	1,500		4,200
Net Totals			5,100	27,300		18,700
Total Load			32,400 BTUs		18,700 BTUs	

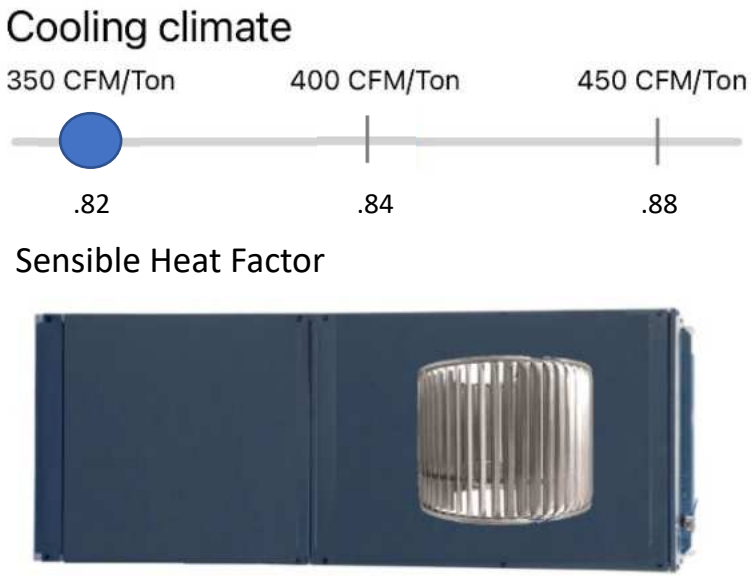
$$\frac{27{,}300 \text{ Sensible Load}}{32{,}400 \text{ Total Load}} = .84 \text{ SHR}$$

Is The SHR and SHF Matched? Should They Be?

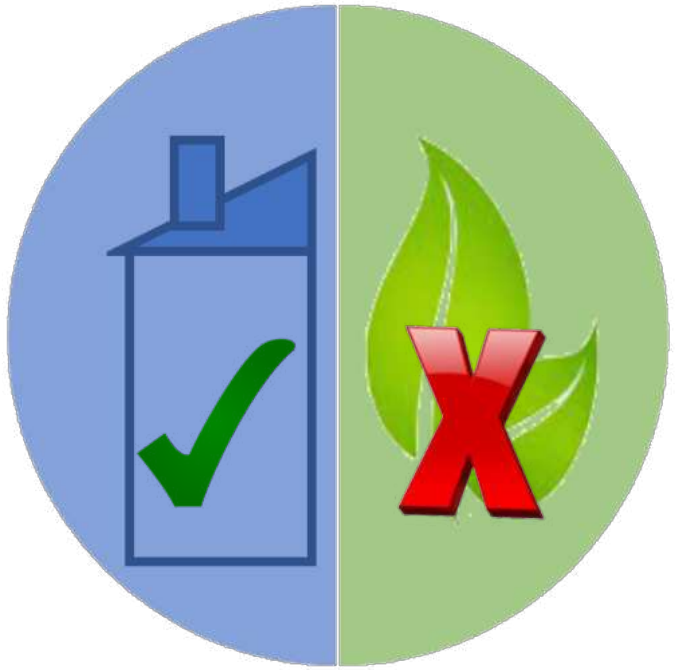
Finding House SHR + Setting AC SHF = Comfort



*Driven by the Man J load & blower door



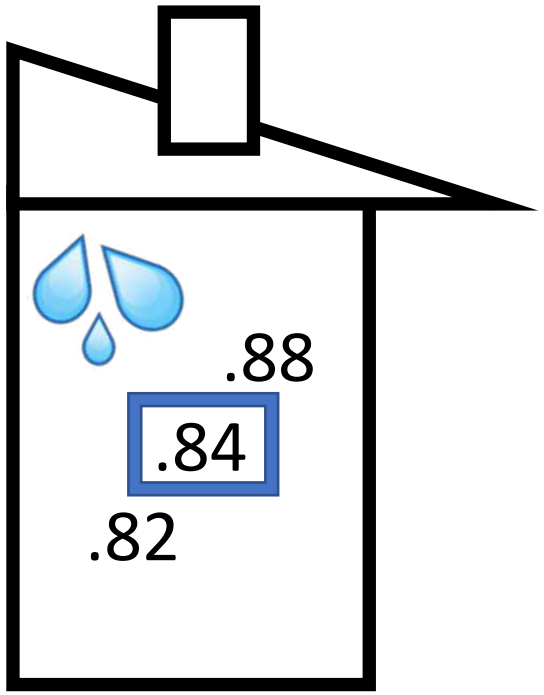
*Too little indoor airflow



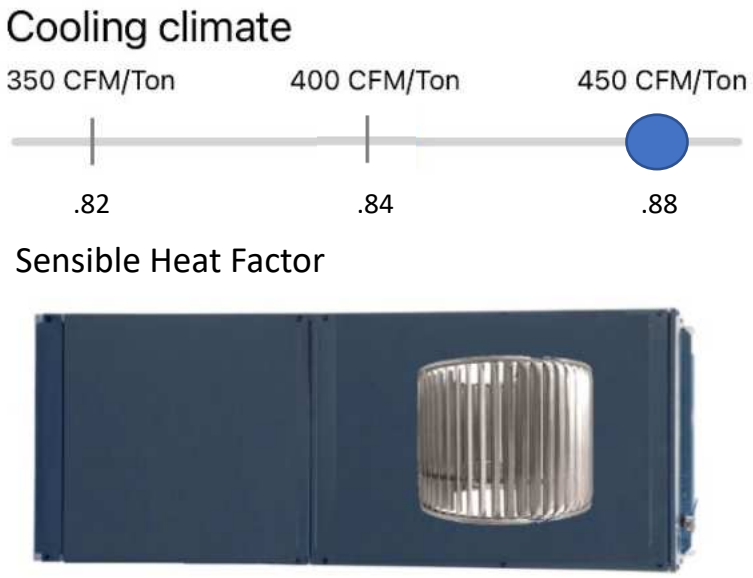
Comfort Efficiency

Is The SHR and SHR Matched? Should They Be?

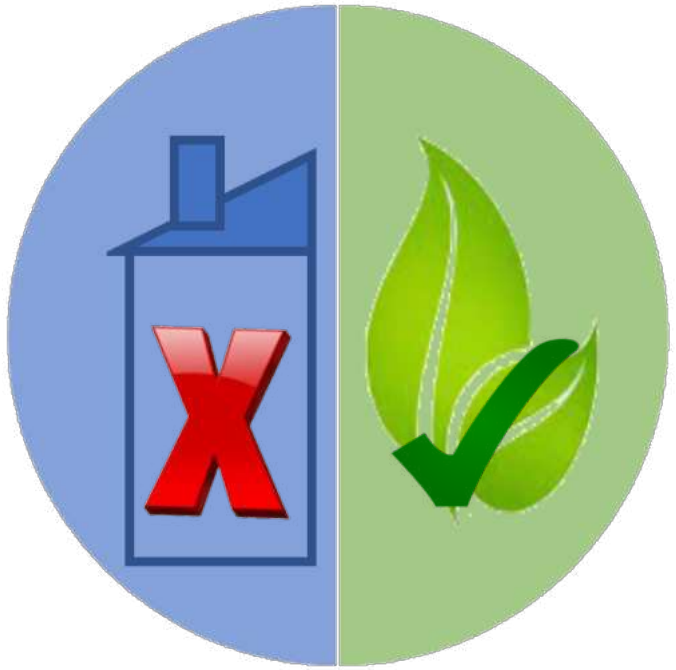
Finding House SHR + Setting AC SHF = Comfort



*Driven by the Man J load & blower door



*Too much indoor airflow



Comfort Efficiency

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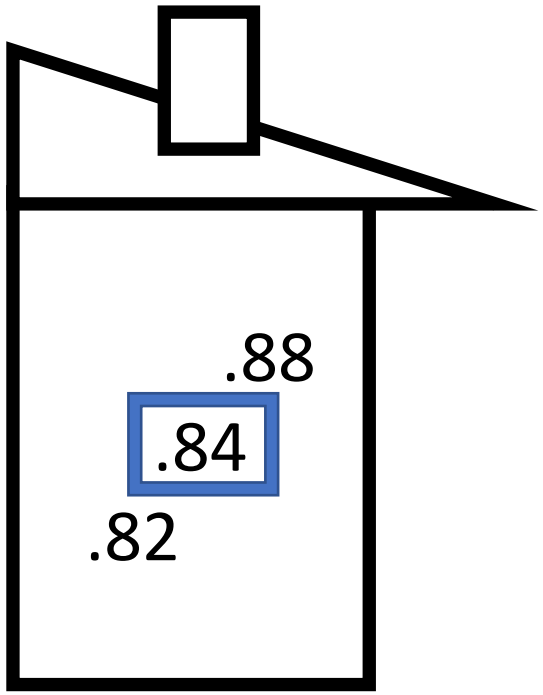
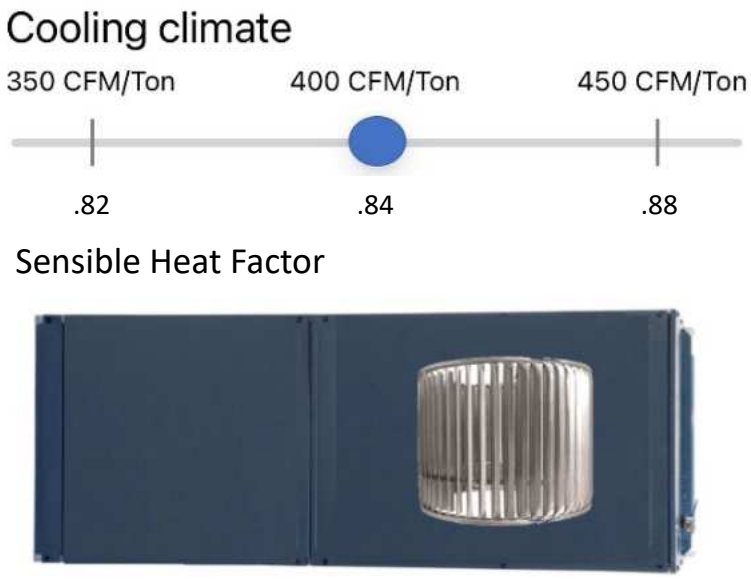




*Driven by the Man J load & blower door

*Perfect indoor airflow

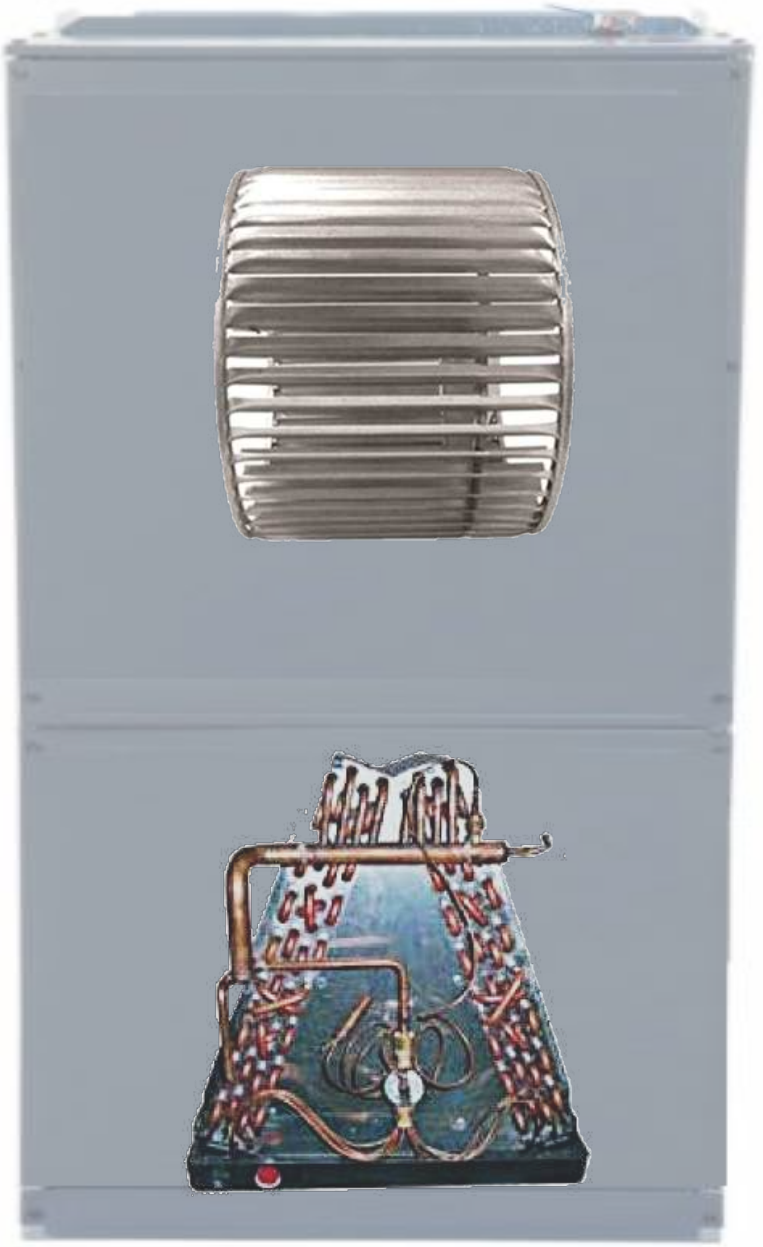
Comfort Efficiency

This is why airflow measurement comes first?

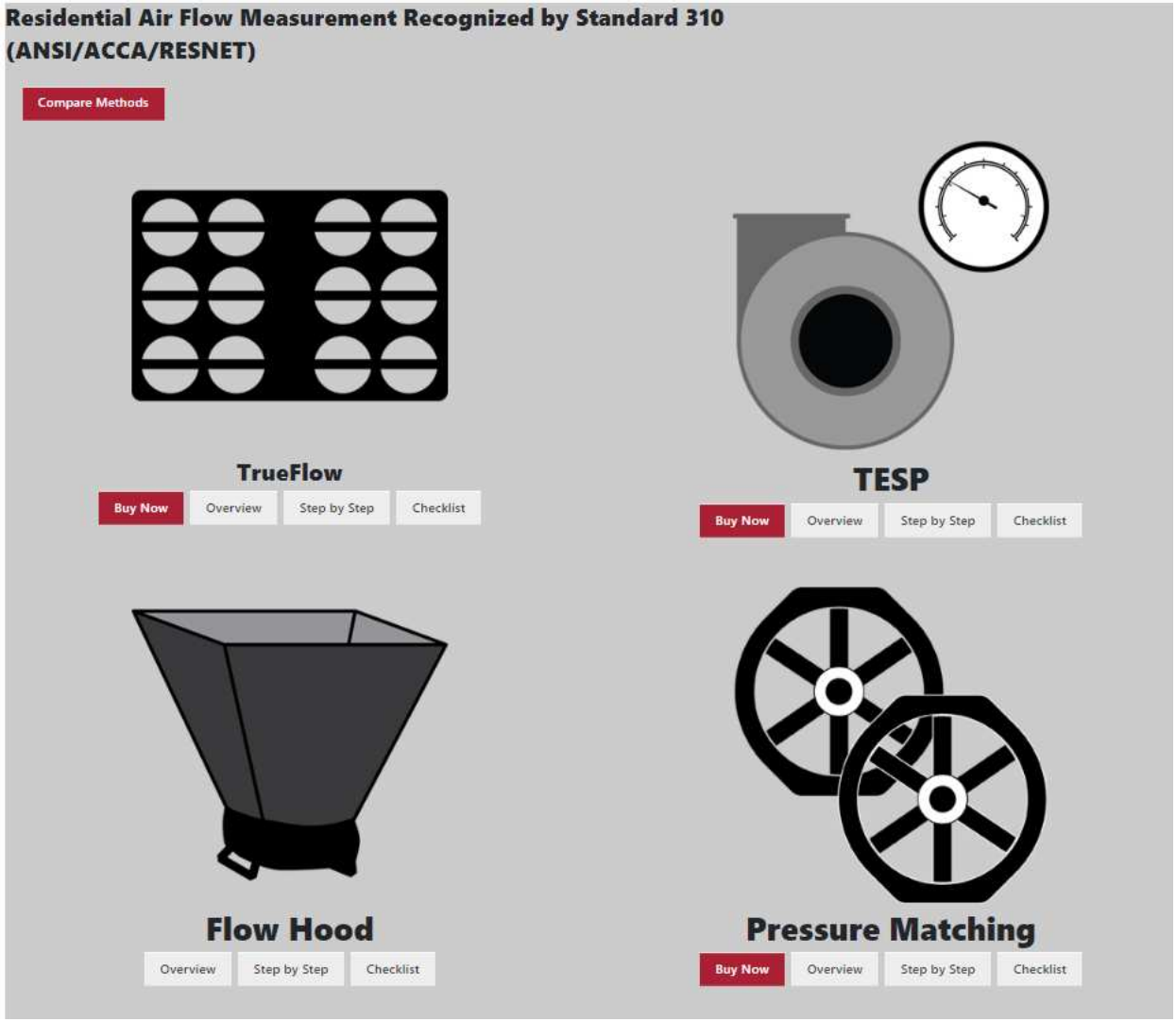
#1 Airflow

Before

#2 Charge



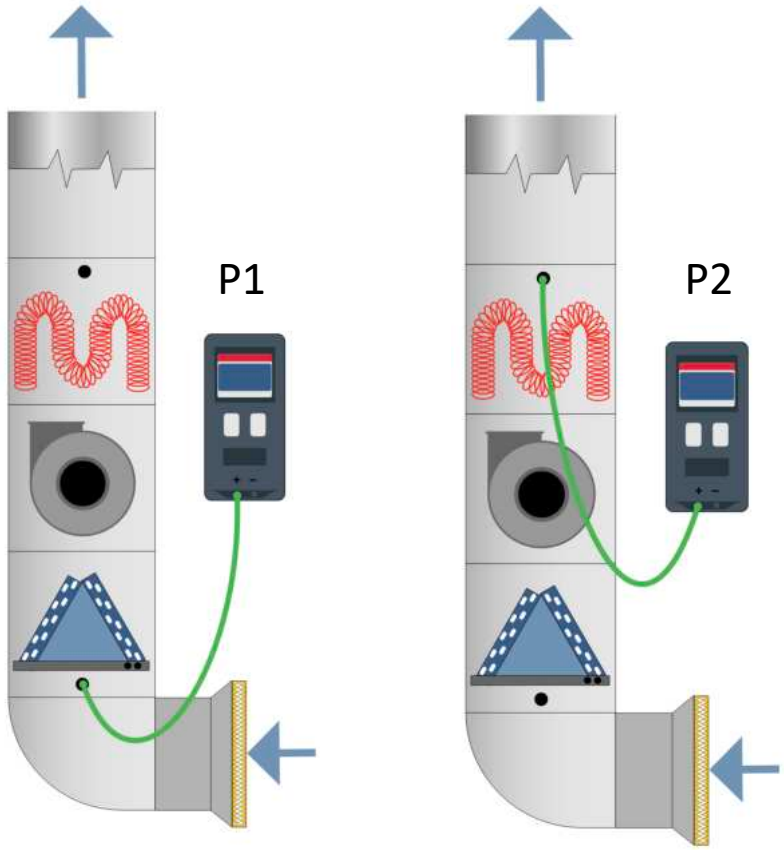
Four Accepted Methods
Measuring HVAC Air Flow



- **Flow Grid**
- Pressure Matching
- Flow Hood
- **Static Pressure & Fan Tables**

Total External Static Pressure & Fan Table

*always follow OEM recommendations

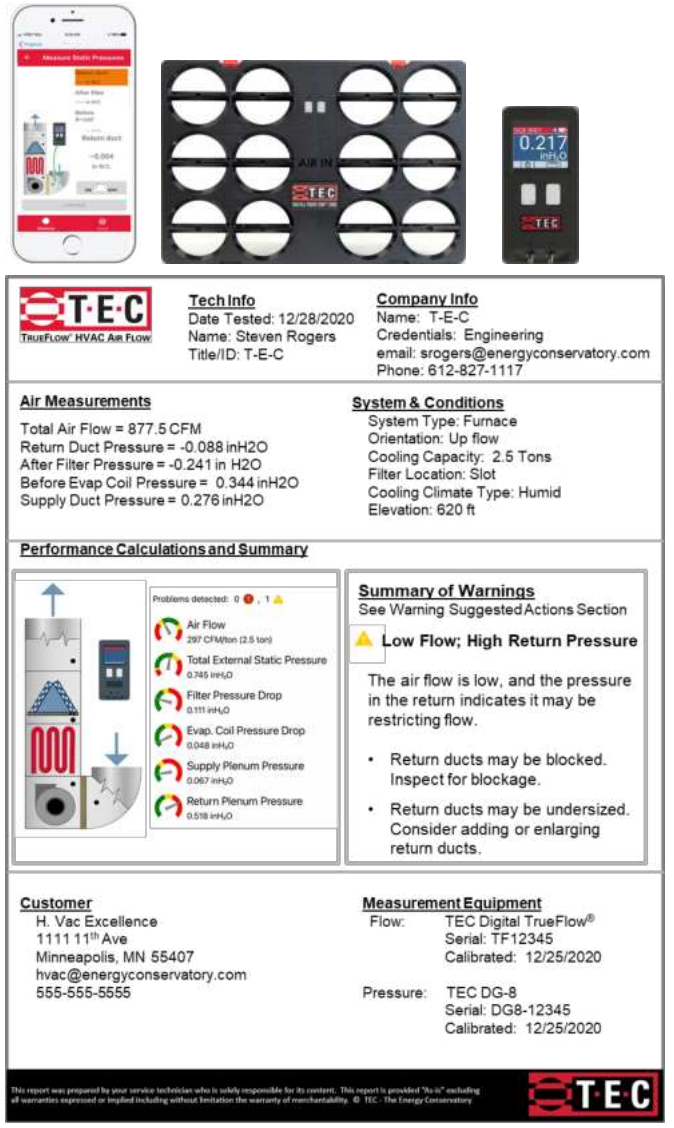


P1 + P2 = TESP

FURNACE AIRFLOW (CFM) VS. EXTERNAL STATIC PRESSURE (IN. W.C.)										
MODEL	SPEED TAP	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90
*UD040R924K	4 -HIGH - Black	1018	1004	982	950	910	860	802	763	660
	3 -MED-HIGH - Blue	847	832	809	779	740	697	644	585	517
	2 -MED-LOW - Yellow	746	731	670	640	610	585	512	452	384
	1 -LOW - Red	617	599	575	544	507	463	413	357	294

Make sure you know the fan speed tap you are using!

TrueFlow® Grid HVAC Air Flow Measurement



T·E·C
TrueFlow® HVAC Air Flow

Tech Info
Date Tested: 12/28/2020
Name: Steven Rogers
Title/ID: T-E-C

Company Info
Name: T-E-C
Credentials: Engineering
email: srogers@energyconservatory.com
Phone: 612-827-1117

Air Measurements
Total Air Flow = 877.5 CFM
Return Duct Pressure = -0.088 inH2O
After Filter Pressure = -0.241 in H2O
Before Evap Coil Pressure = 0.344 inH2O
Supply Duct Pressure = 0.276 inH2O

System & Conditions
System Type: Furnace
Orientation: Up flow
Cooling Capacity: 2.5 Tons
Filter Location: Slot
Cooling Climate Type: Humid
Elevation: 620 ft

Performance Calculations and Summary

Problems detected: 0 , 1
Air Flow
297 CFM/ton (2.5 ton)
Total External Static Pressure
0.745 inH2O
Filter Pressure Drop
0.111 inH2O
Evap. Coil Pressure Drop
0.048 inH2O
Supply Plenum Pressure
0.067 inH2O
Return Plenum Pressure
0.518 inH2O

Summary of Warnings
See Warning Suggested Actions Section

Low Flow; High Return Pressure

The air flow is low, and the pressure in the return indicates it may be restricting flow.

- Return ducts may be blocked. Inspect for blockage.
- Return ducts may be undersized. Consider adding or enlarging return ducts.

Customer
H. Vac Excellence
1111 11th Ave
Minneapolis, MN 55407
hvac@energyconservatory.com
555-555-5555

Measurement Equipment
Flow: TEC Digital TrueFlow®
Serial: TF12345
Calibrated: 12/25/2020

Pressure: TEC DG-8
Serial: DG8-12345
Calibrated: 12/25/2020

This report was prepared by your service technician who is solely responsible for its content. This report is provided "As-is" excluding all warranties expressed or implied including without limitation the warranty of merchantability. © TEC - The Energy Conservatory

T·E·C

Ducted Heat Pump
New Construction: HVAC Contractor Process Overview

1. Evaluate the Design
2. Confirm Duct Leakage
3. Confirm System Airflow
4. Check Power Consumption
5. Measure Refrigerant Charge

- Checking the blower watt draw confirms that the ducts are not too restrictive and that the blower motor is working correctly.

- Ensure the refrigerant charge delivers the right superheat and sub-cool temperatures to match the indoor air flow

Ask the experts!

Joe Medosch and I asked our industry friends:

If you were told you only had 30 minutes or less and you have, a smartphone/tablet (w/Apps), a digital manometer and tubing, static pressure probes, a flashlight, a ladder, a roll of paper towels, and a cordless drill/screwdriver, some additional handheld tools...

What tests or assessments would you make to deliver the most value to a home site visit?

This doesn’t matter if you are an HVAC tech/installer,

Rater, or a builder

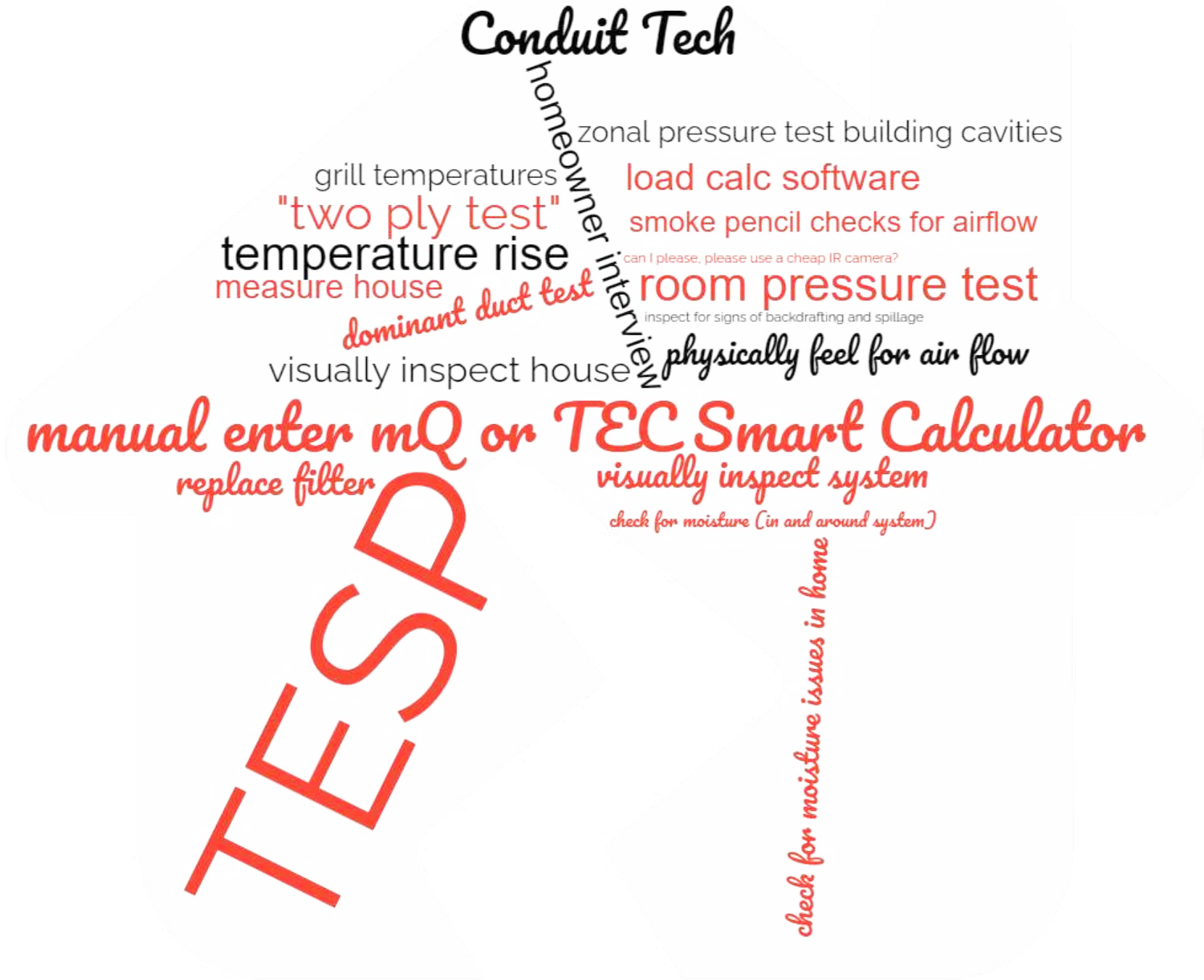
What did the folks have to say?
~30 Survey Responses

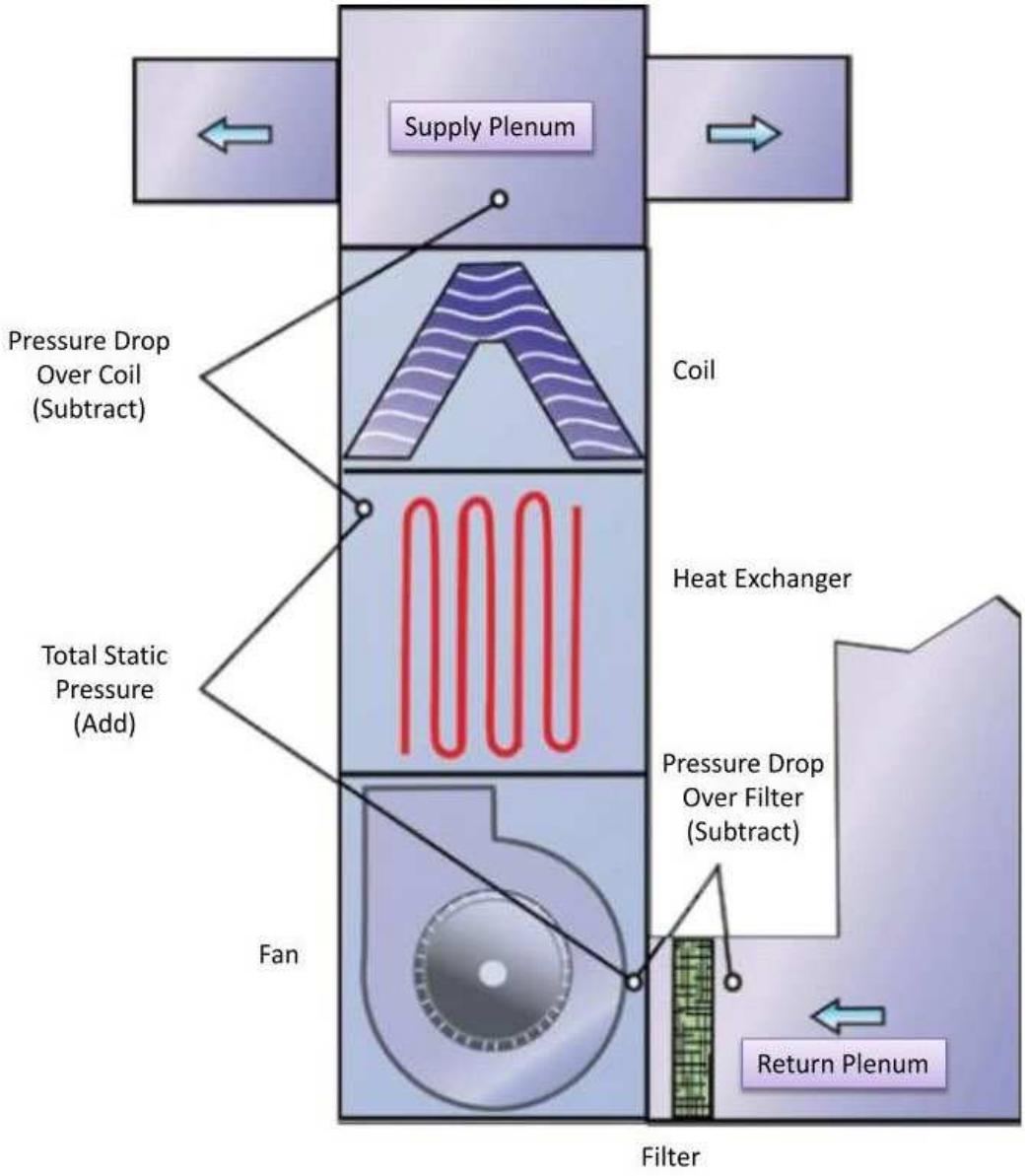
Special thanks to:

Bruce Manclark
Tim Portman
Steve Rogers
Dustin Coles
Bill Spohn
Corbett Lunsford
Ed Janowiak
Jim Bergmann
Billy Spohn

Michael Housh
Kim DeVoe
Chris Conway
Russ King
Rick Hall
Adam Mufich
Rob Minnick
Stephen Rardon
Casey Phillips

Bill Fisher
Cody Brasseal
Tim DeStasio
Ben Baca
Alex Meaney
Kenneth Budka
Chris Hughes
Sam Myers
Shawn LeMons
James Jackson


Conduit Tech
homeowner interview
zonal pressure test building cavities
grill temperatures
load calc software
"two ply test"
smoke pencil checks for airflow
temperature rise
can I please, please use a cheap IR camera?
measure house
room pressure test
dominant duct test
inspect for signs of backdrafting and spillage
visually inspect house
physically feel for air flow
manual enter mQ or TEC Smart Calculator
replace filter
visually inspect system
check for moisture (in and around system)
TESP
check for moisture issues in home



What is TESP?

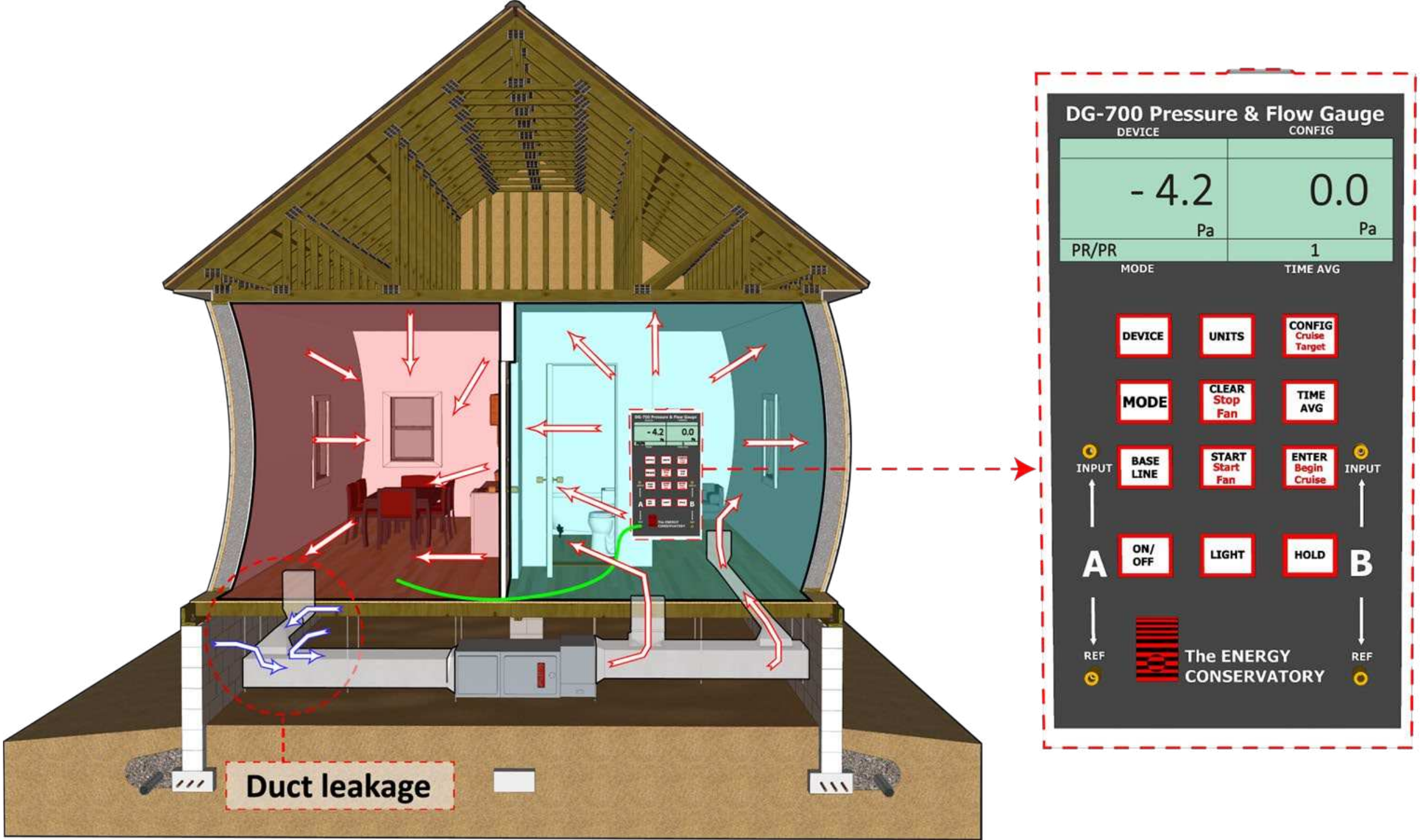
Total External Static Pressure

High Static Pressure with an ECM

With a high TESP, fan energy goes up

Table 10. Annual energy simulation results for both homes at baseline using the Austin contractor's designs

Home	Duct type	Blower type	Total Pressure (in. w.c.)	Airflow rate (CFM)	Cooling (kWh)	AHU Fans (kWh)	Total Electricity (kWh)	Heating ($\times 10^6$ Btu)	Total Gas Consumption ($\times 10^6$ Btu)
Chicago 3-ton AC Gas furnace 1200 CFM nominal	Flex	PSC	0.50"	1200	619	542	8108	60.95	88.88
			0.80"	964	661	531	8139	60.93	88.85
			1.10"	622	786	600	8331	63.71	91.70
		ECM	0.50"	1200	611	319	7878	61.55	89.51
			0.80"	1162	614	411	7972	60.47	88.39
			1.10"	1103	631	478	8056	60.86	88.78
	Metal	PSC	0.50"	1200	611	531	8086	59.52	87.41
			0.80"	964	656	525	8128	60.25	88.16
			1.10"	622	769	583	8300	62.17	90.12
			0.50"	1200	603	314	7861	60.10	88.02


DG-700 Pressure & Flow Gauge
DEVICE
CONFIG
- 4.2
Pa
0.0
Pa
PR/PR
MODE
1
TIME AVG
DEVICE
UNITS
CONFIG
Cruise
Target
MODE
CLEAR
Stop
Fan
TIME
AVG
INPUT
BASE
LINE
START
Start
Fan
ENTER
Begin
Cruise
INPUT
A
ON/
OFF
LIGHT
HOLD
B
REF
The ENERGY
CONSERVATORY
REF
Duct leakage


CIRRUS
Wind Indicator

measureQuick workflows – manual entry or readings with the app!

Guided Workflow Tutorials w/ Joe: Installation - Part 1

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23
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Announcing measureQuick 2.5

Written by **Ben Reed**,
October 12, 2023

After 6 months of development and 3 months of beta testing, measureQuick 2.5 is finally released to the public.

measureQuick 2.5 is our most powerful and user-friendly version of measureQuick yet. With our new Guided Workflows, improved Bluetooth connectivity, ACCA VEO Certificates, and mQ Cloud updates, measureQuick 2.5 will help HVAC professionals improve their efficiency and profitability like never before.

New Features in mQ2.5

Guided Workflows

Guided Workflows are step-by-step instructions for completing common tasks, such as performing a maintenance check-up or installing a new system. Each Guided Workflow includes helpful pictures and instructions, as well as action items and next steps that must be completed before moving on.

Guided Workflows are a game-changer for HVAC professionals of all experience levels. They can help you complete tasks quickly and efficiently, reduce the risk of errors, and improve the quality of your work.

https://measurequick.com/solving-our-labor-endemic/

Introducing New Roles to Revitalize the HVAC Industry

measureQuick proposes two pivotal roles for the industry:

Tech-Efficiency Specialists (TES)

Advanced Residential Commissioning Specialists (ARCS).

These roles are designed to address the immediate needs of the market while complementing the current workforce. Union or non-union workers, these professionals are desperately needed.

Turning this into job descriptions

Tech-Efficiency Specialists (TES)

Could easily be a Rater or Builder!

TES experts are at the forefront of enhancing homeowners' heating and cooling experiences. They bridge the gap between homeowners and contractors, focusing on system efficiency and sustainability.

They advocate for energy-efficient solutions, playing a key role in transforming maintenance into an opportunity for system improvement and profitable installations.

Advanced Residential Commissioning Specialists (ARCS)

Most likely HVAC tech or Rater

ARCS ensure newly installed HVAC systems are finely tuned to design specifications. Their work is crucial in validating system performance and efficiency.

ARCS are responsible for duct leakage testing, precise evacuation, airflow adjustment, and accurately setting the refrigerant charge. They ensure peak system efficiency, contributing significantly to system longevity and reliability.

National Comfort Institute

Who should attend?

HVAC Contractors, Salespeople, and Managers

Grow Profitably with Air Upgrades Online Live Overview

Agenda

Section 1: Why Airflowa Upgrades are Critically Important

- Why do I need profitable growth?
- What is an Airflow Upgrade?
- Why are Airflow Upgrades so important?

Section 2: How Airflow Upgrades Improve Business Profitability

- How can a 5-minute test generate leads?
- How do Airflow Upgrades improve business?
- How do I add this to my business?

Upon completion, you will receive a digital **Implementation Quick Reference Guide** with step-by-step instructions to assist in the successful integration of this powerful approach into your business. As bonus, you'll also receive NCI's **Total External Static Pressure Test Procedure.**

Grow Profitably with Airflow Upgrades Online Live

Contractor Price: ~~$95~~ 49*

**In response to the COVID-19 Pandemic this class is available for a limited time at a discounted rate for qualified HVAC professionals.*

Top 5 Items to Communicate to Homeowners

Proper sizing, selection, and ***air flow*** lead to longer run times…

1. Longer run times means better destratification
2. Longer run times means better dehumidification
3. Longer run times means less temperature swings
4. Longer run times means better filtration
5. Longer run times means your heat pump runs at most efficient speed

This is WHY we do a comfort consultation/energy audit with existing homes and why we commission new systems!

Heat Pump Resources

cee

The “Other”

CEE SM

Consortium for Energy Efficiency

NEEP’S COLD CLIMATE AIR SOURCE

Heat Pump List

Natural Resources Canada

EEBA
Energy & Environmental Building Alliance

PUMP UP THE AIR FLOW

GET YOUR HEAT PUMPS COMMISSIONED

Dan Wildenhaus
Senior Technical Manager - Training and Consulting Services,
Center for Energy & Environment

Bill Graber
Partner, The Energy Conservatory