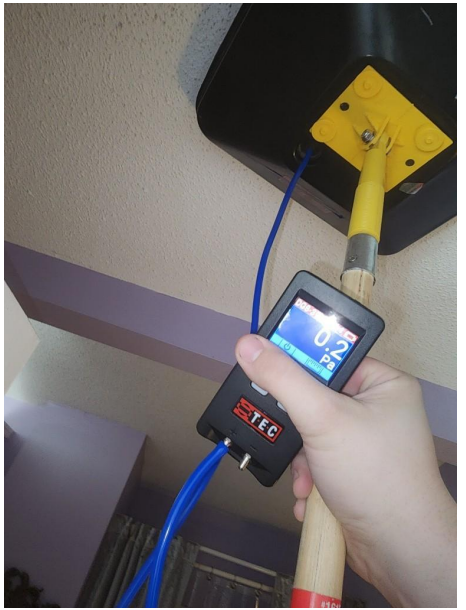

SEEA
DUCT DIAGNOSTICS:
The Key to Optimizing Your HVAC Upgrades
STOP

Optimizing Heat Pump Readiness Project

- One of nine retrofit solutions teams working with industry to implement best practices.
- Project goal: Increase the practice of addressing poorly performing ductwork during HVAC changeout.
- Collecting and analyzing data on barriers, opportunities, and benefits from:
  - Utility program and program implementer
  - Feedback from contractors and other stakeholders
- Solutions identified include *advanced tools* and *financial assistance*.

Building America
U.S. DEPARTMENT OF ENERGY



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https://www.energy.gov/cmei/buildings/building-america-retrofit-solutions-teams

Duct Diagnostics

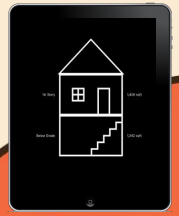
The Key to Optimizing Your HVAC Upgrades

Presenter Information

Name: Steve Rogers
Title: President, Co-Owner
Organization: The Energy Conservatory (TEC) (Minneapolis Blower Door)
Steve's Bio:
• President of The Energy Conservatory since 2017, 11 years at TEC
• 19 years at Emerson in technical & engineering roles focused on pressure & flow measurement.
• Worked for Dwyer Instruments in a Principal Engineering role
• Serves/served on standards committees for ASME, ISO, and ASHRAE.
• Holds 15 patents related to the measurement of flow and technical software
• Fluent in Portuguese and Spanish
Education
• Bachelor of Science in Mechanical Engineering from Brigham Young University.
• His favorite classes were Thermodynamics, Fluid Dynamics, and Heat Transfer

HVAC RETROFIT MASTER PROCESS

THE ENERGY CONSERVATORY



2. LOAD

3. DUCT

6. COMMISSION

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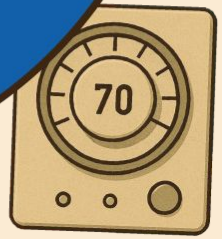
1. GATHER INFO

4. EQUIPMENT & SCOPE

5. INSTALL & CONTROLS



DUCT AIR FLOW & CAPACITY

Demonstration: Who can drink a bottle of water faster?

Contestant #1

Contestant #2

Contestants, was that a fair contest?

Who had to work harder?

How do I know which “straw” I have in this house?

The Digital TrueFlow® Grid

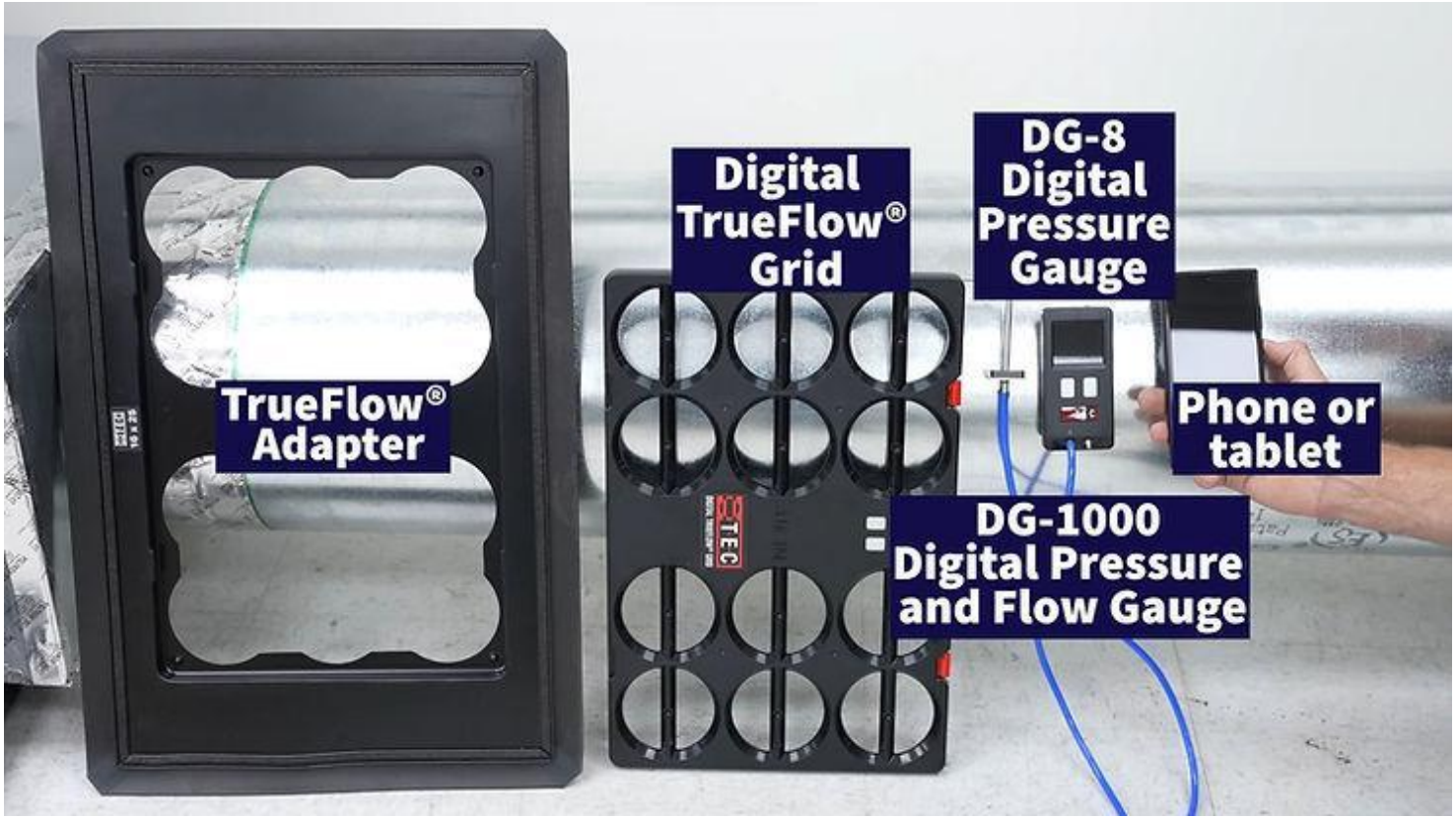
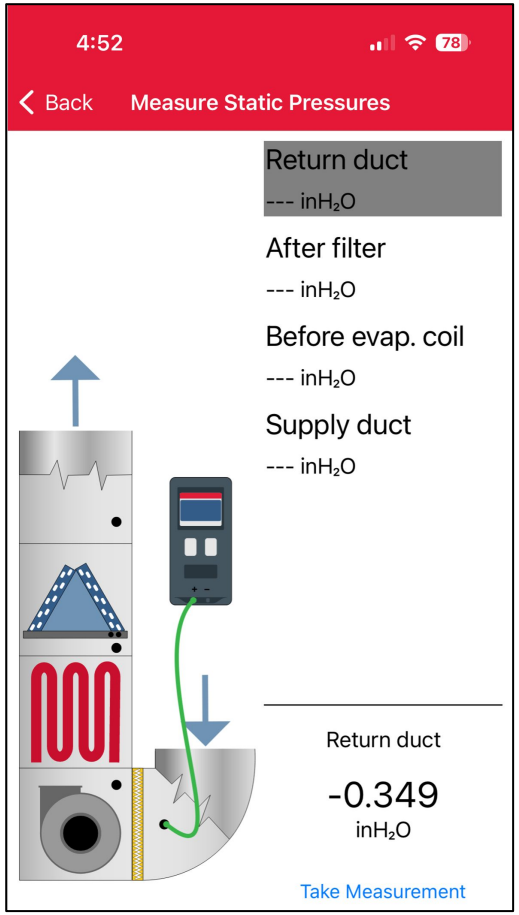
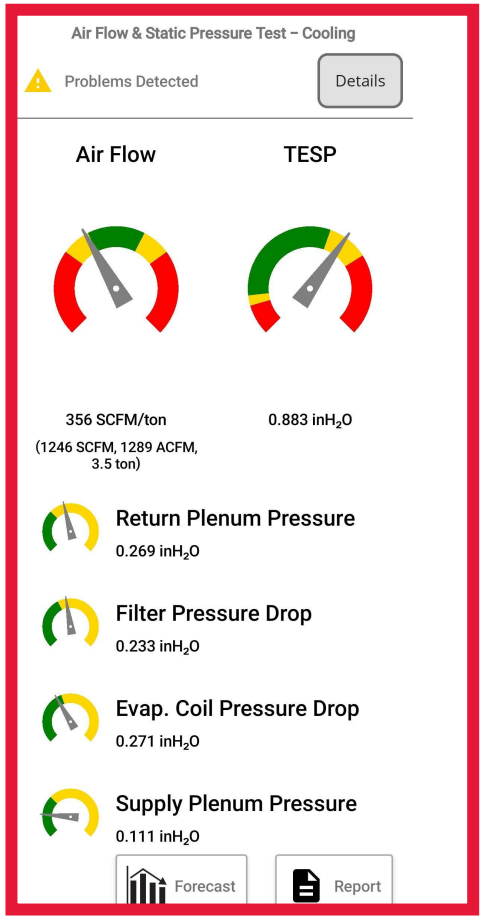


Photo thanks to Craig at acservicetech.com

DUCT AIR FLOW & CAPACITY



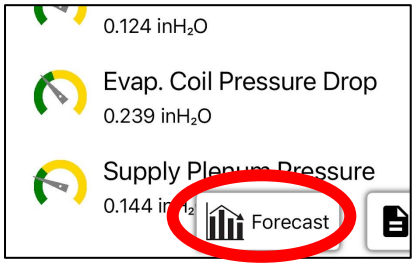


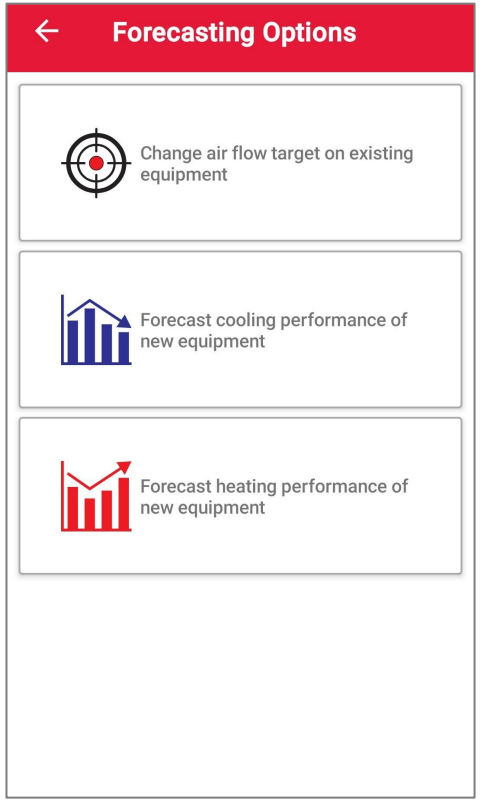
"Test In" of Existing System w/ TrueFlow App

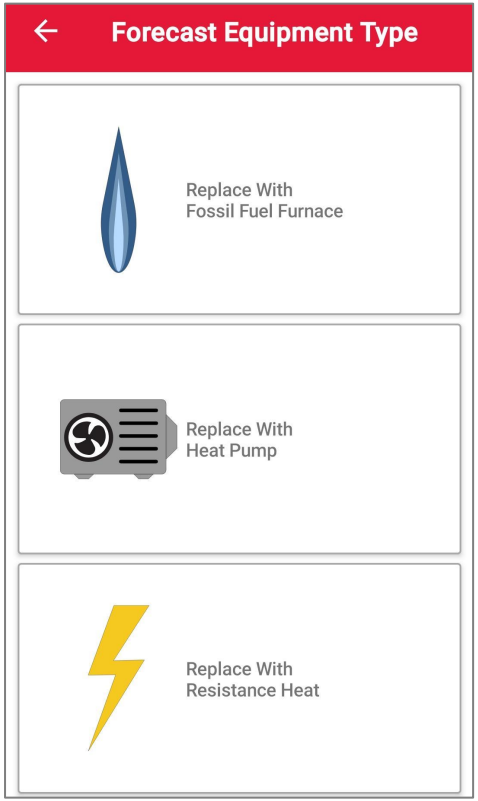
- Guides user for each pressure reading
- Bluetooth connection logs pressure readings
- Summary given of all readings with "Green/Red" results

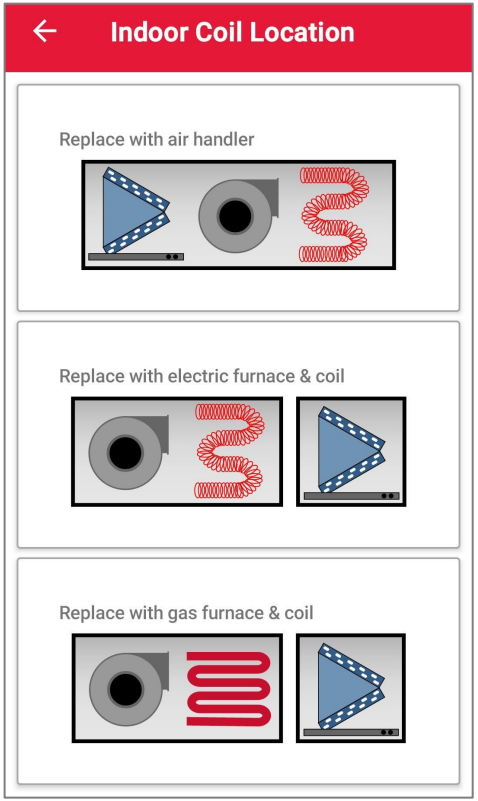
- If not using TrueFlow, there is an option where you can use the App and manually enter the pressure readings. This guides the process for new techs, and can be used with any manometer

FORECAST – New System Info





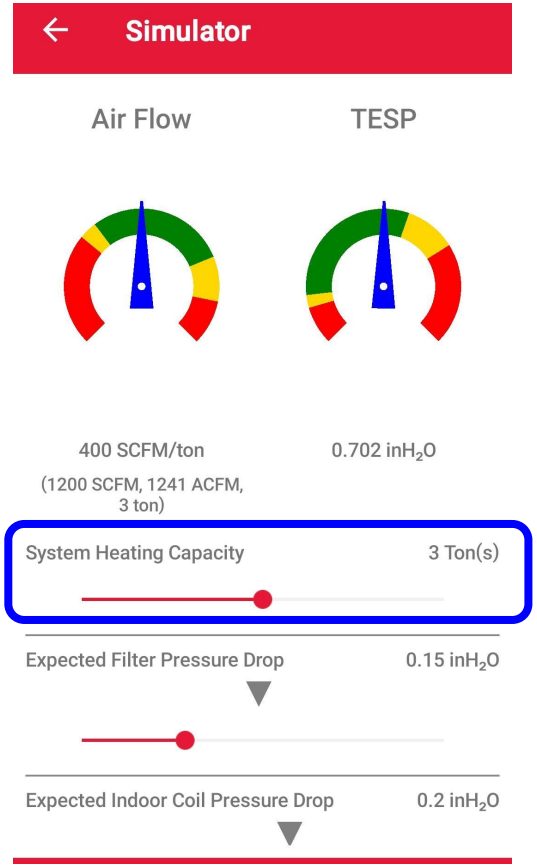


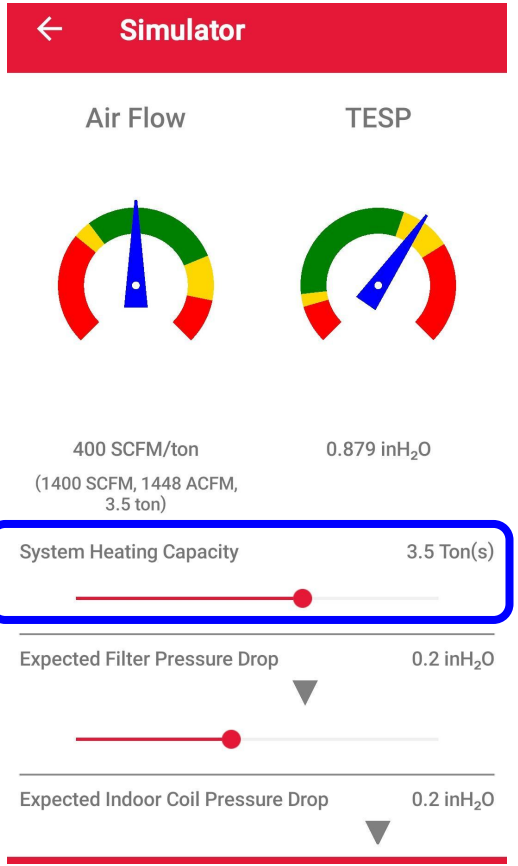


FORECAST – 3 ton vs 3.5 ton

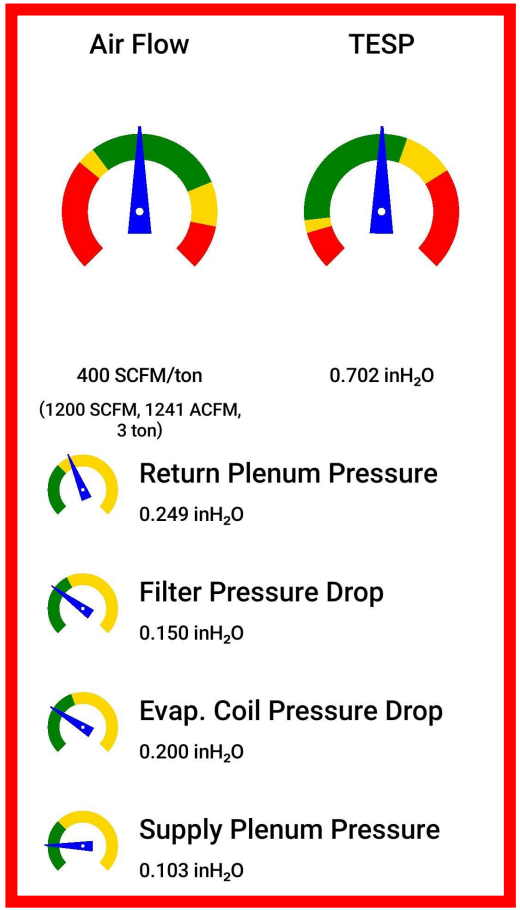
Choose:

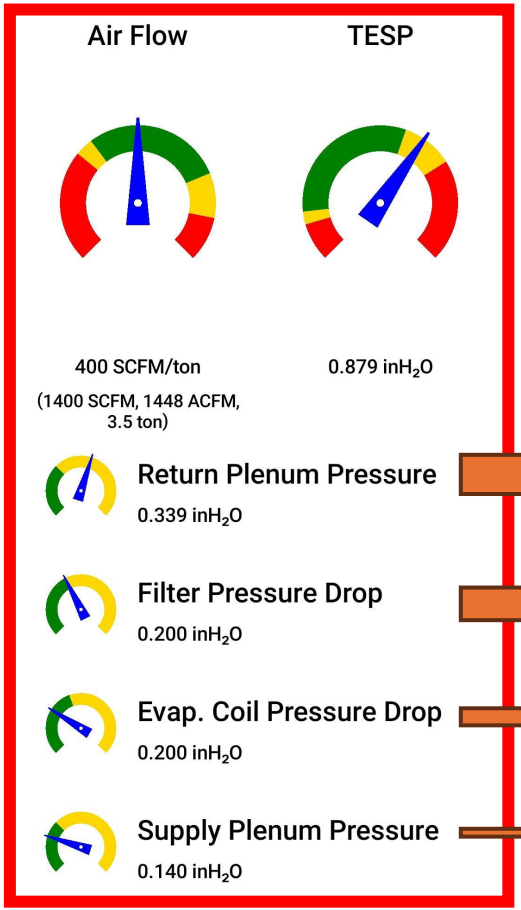
1. System Capacity
2. Filter Drop
3. Coil Drop





FORECAST – Where is the Problem?





Most Common !

Also Common

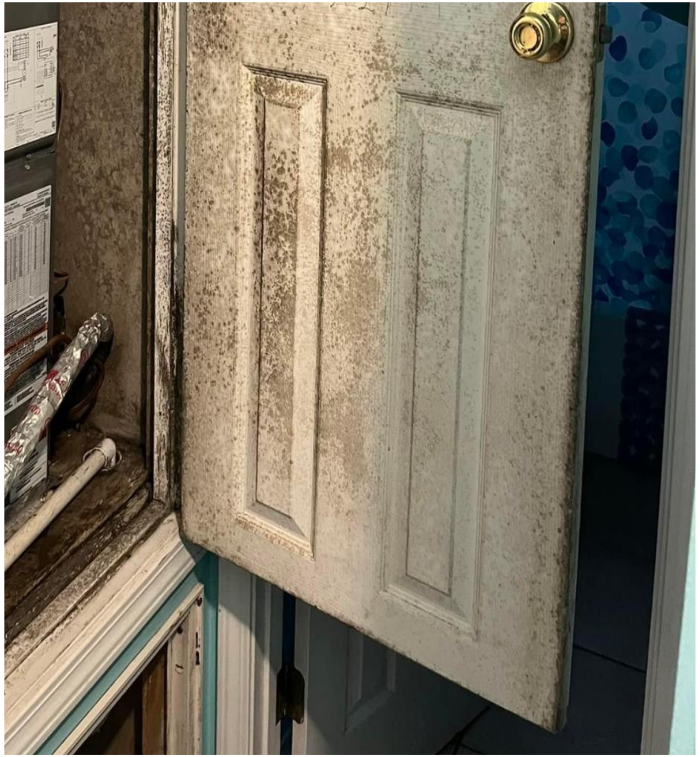
Less Common
(brand, what you ask for)

Fairly Uncommon

WHAT DO THESE TWO PROBLEMS HAVE IN COMMON?

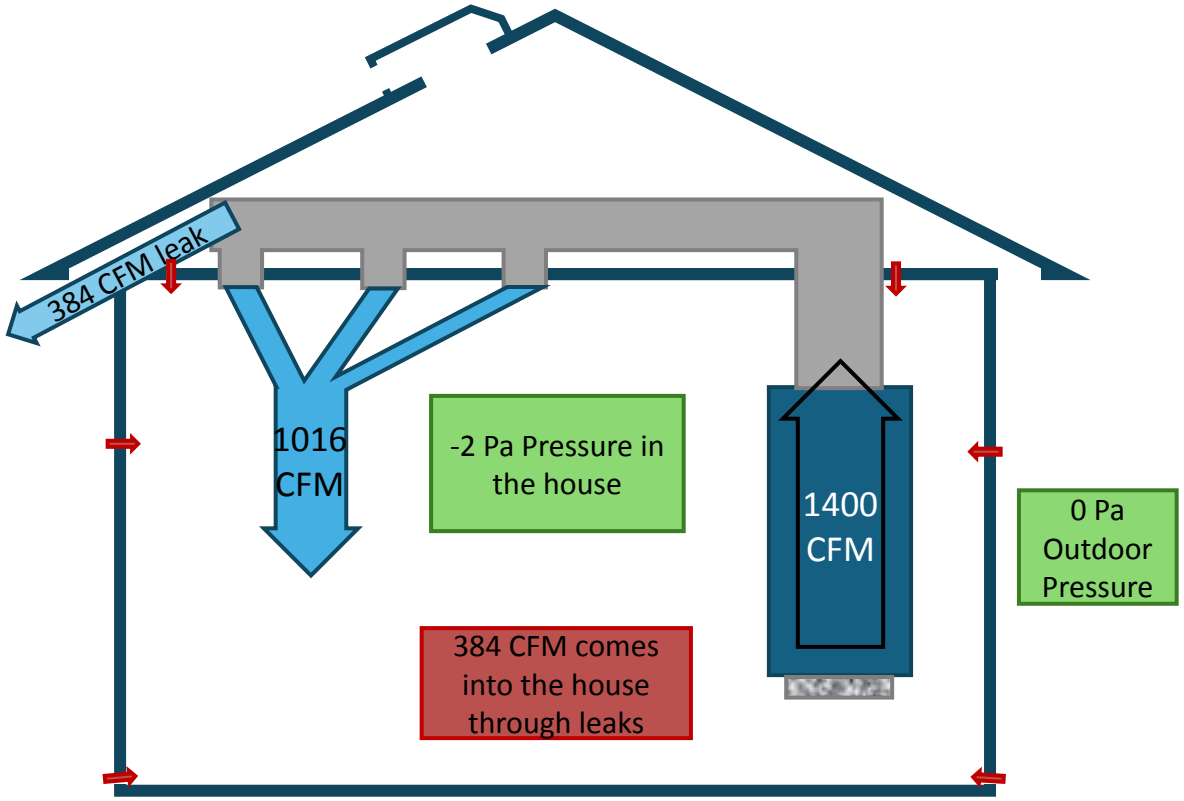
Climate Zone 6

Climate Zone 2



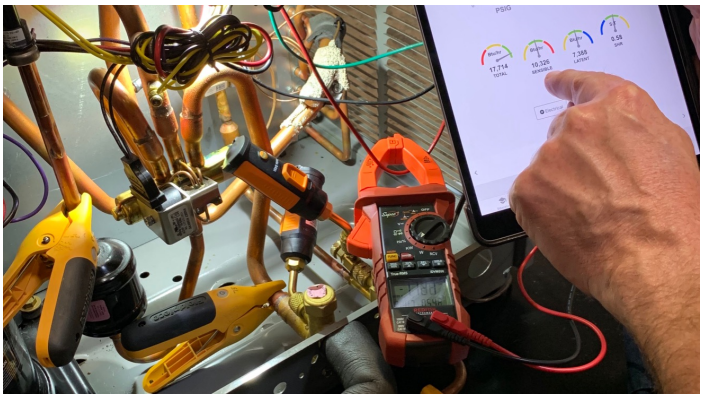
Both are Caused by DUCT LEAKAGE TO THE OUTSIDE!

- 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



The Key to Optimizing Your HVAC Upgrades

Duct Diagnostics



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1

Impact of Improper Installation

70-90% of residential HVAC systems have energy-wasting installation faults

100% if Duct Leakage is included

9% energy waste annually

$2.5 billion in utility bills

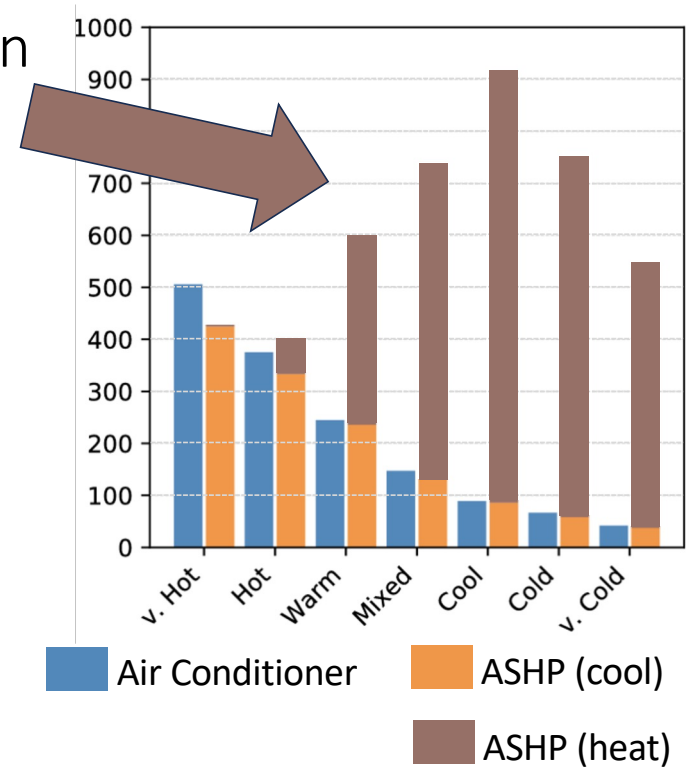
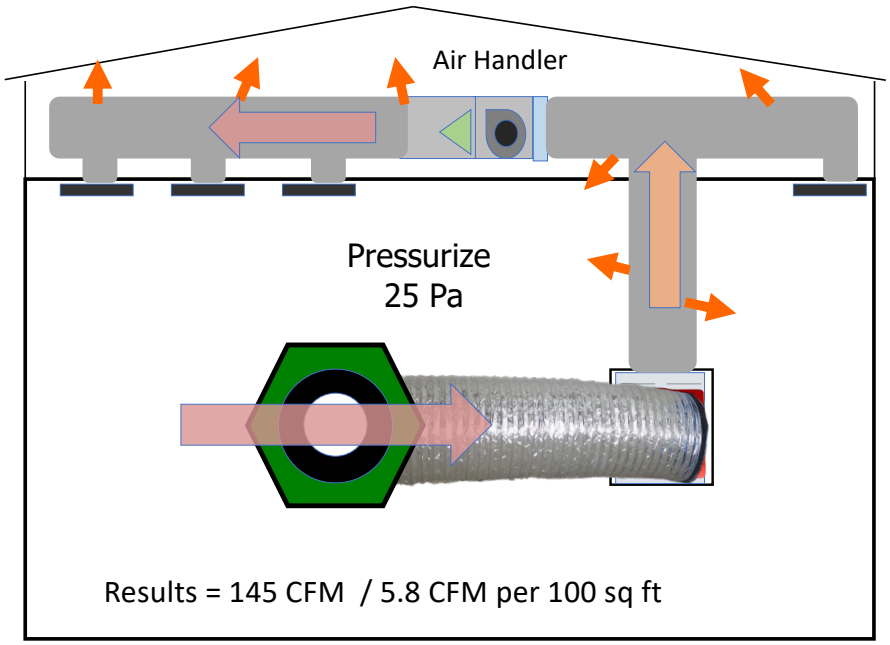


Fig. 8. Energy use increase per house caused by indoor airflow rate and refrigerant charge faults

https://www.pnnl.gov/main/publications/external/technical_reports/PNNL-30077.pdf

3

Total Leakage – Pressurization



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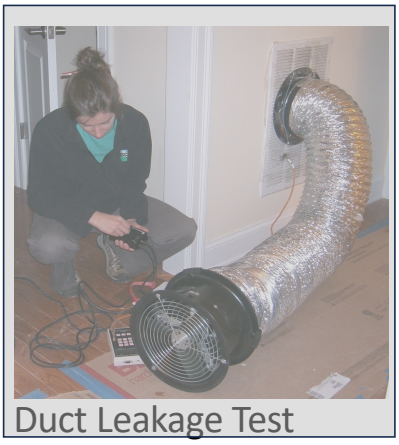
Ducts Are Sealed

4

Duct Measurements



Duct Leakage Test

A

Total Airflow Measurement at the Return

B

Individual Airflow Measurement at the Supplies

A – B = Estimated Leakage

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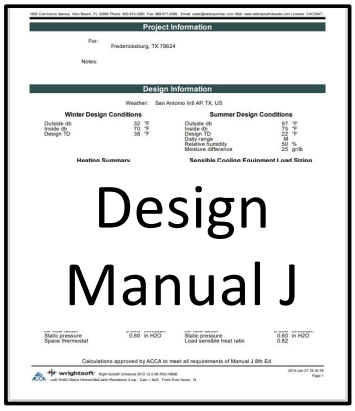
5

ACCA QI Verified System Performance



Duct Leakage Test

Airflow Measurement

System Balancing

ACCA QI QUALITY INSTALLATION
VERIFIED SYSTEM PERFORMANCE
Powered by measureQuick®

ENERGY STAR VERIFIED HVAC INSTALLATION

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6

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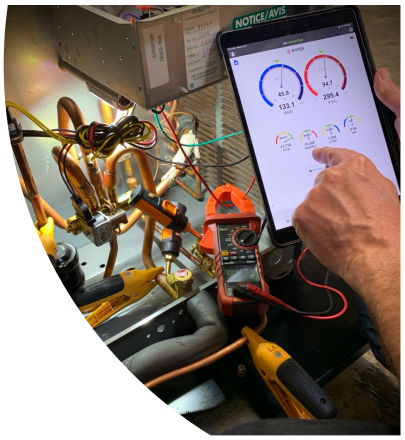
Fully Integrated tools



- Testo Smart Probes — Bluetooth Tool Kit
- Fieldpiece Products — Bluetooth Tools
- Navac — Bluetooth Tools
- JB Products — Bluetooth Tools
- Yellow Jacket Products — Bluetooth Tools
- iManifold / iConnect — Bluetooth Tools
- CPS Link Probes — Bluetooth Tool Kit
- UEi HUB — Bluetooth Tool Kit
- Redfish iDVM550 — Bluetooth-enabled power clamp meter
- CPS VOLT-100 — Bluetooth-enabler power clamp Meter
- TEC DG-8 — Manometer
- TEC DG-1000 — Bluetooth Duct Tester
- Parker Sporlan Pro/R — SMART Pro/R Service Tools
- Parker Sporlan Gen 1 Probes — SMART Service Tool Kit
- Sauermann Combustion Analyzers — Bluetooth Tools
- BluFlame Combustion Analyzer — Bluetooth-enabled combustion analyzer

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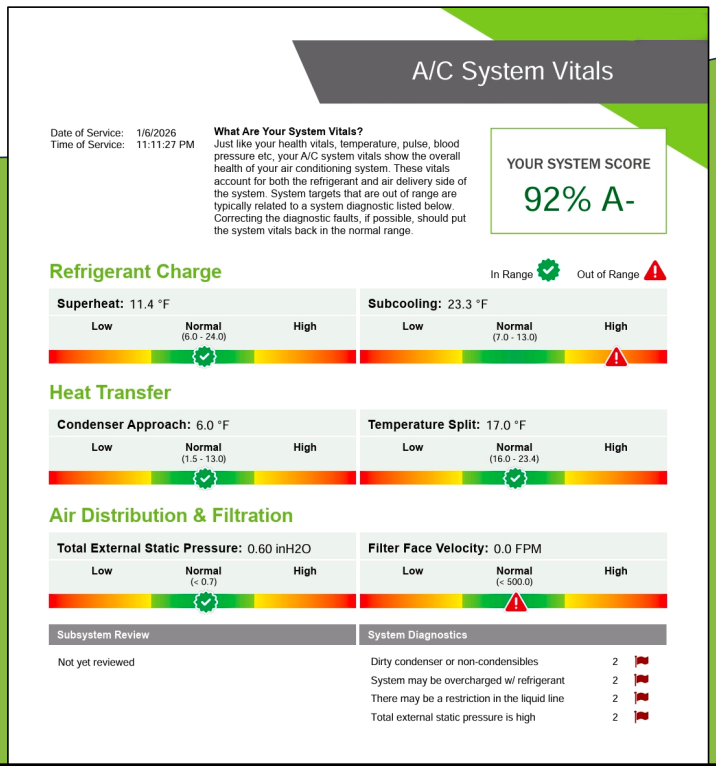
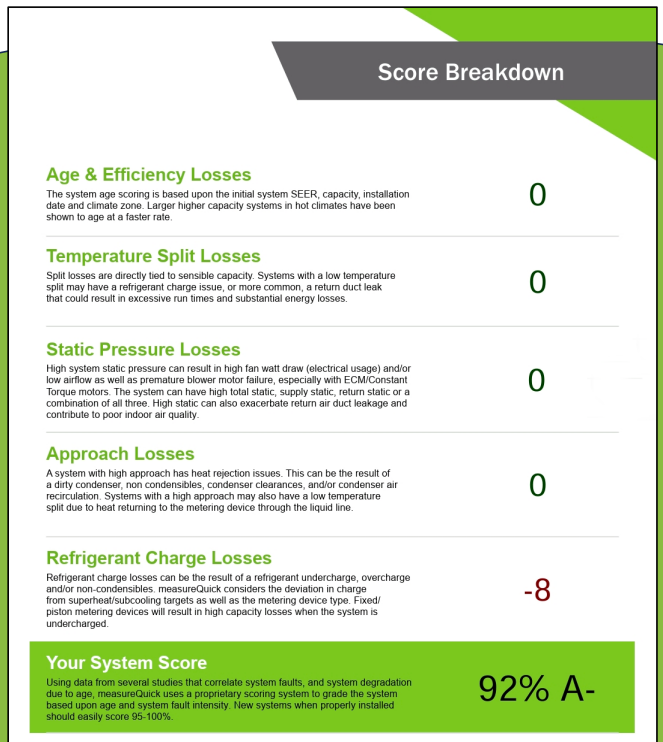
7

Vitals measurements





8

What probes do are REQUIRED?

1. Return Air Temp. - Hygrometer 1
2. Supply Air Temp. - Hygrometer 2
3. Return Static Press. – Manometer 1
4. Supply Static Press. – Manometer 2
5. Outdoor Air Temp. Hygrometer 3
6. Suction Line temp. – Clamp 1
7. Liquid Line temp. – Clamp 2
8. High pressure (high) – Press. Port 1
9. Low pressure (low) – Press. Port 2

- Electrical Meter - EER/SEER

- Vitals Score
- Benchmarking
- Streaming

9

Probe Placement - Inside

Inside

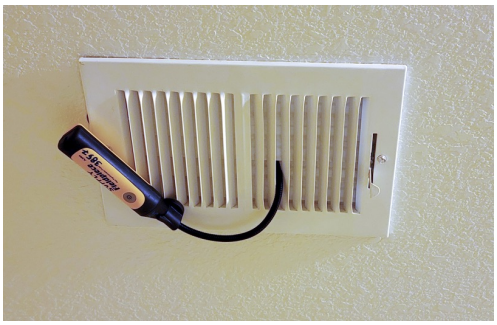
- Return air temp. RA - 

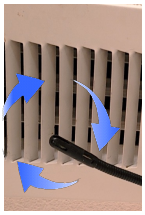
  at return grill closest to the air handler

- Supply air temp. SA – 

  at supply grill closest to the air handler

  probe must be inside the grill not on the face





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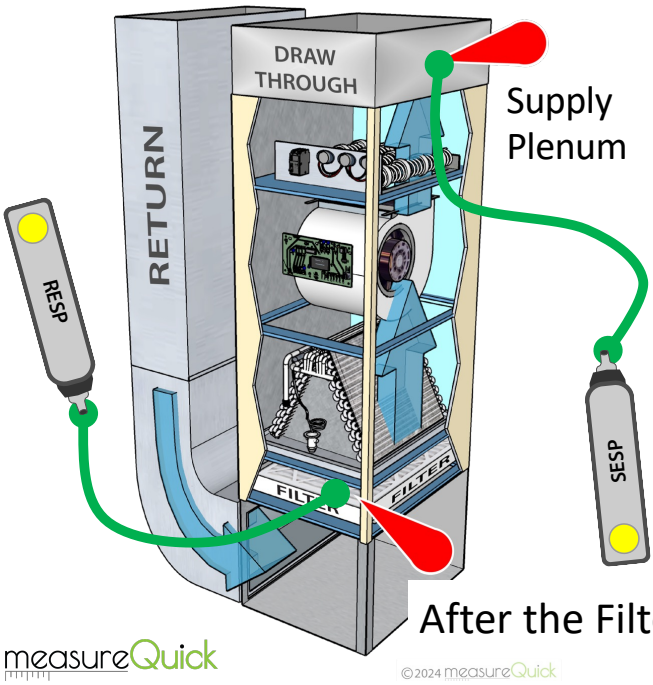
10

Total External Static Pressure

Air Handler



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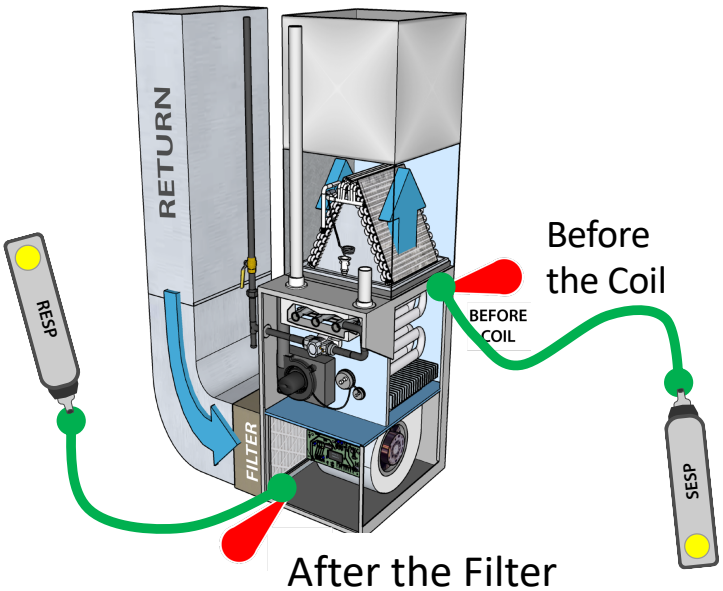
Furnace



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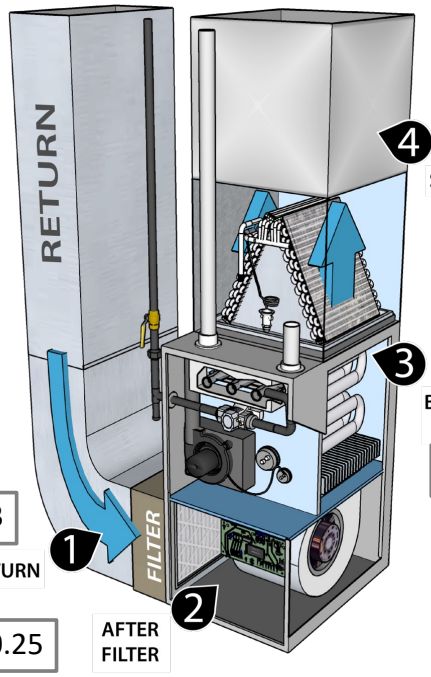
NCI Static Pressure Screening

Split/Furnace w/Slot		Budget
Total External Static Pressure (inH2O)	0.63	0.50 Rated
① Return measurement (inH_2O)	0.13	
Return Pressure Drop (inH_2O)	0.13	0.10
② After Filter measurement (inH_2O)	0.25	
Return (0.13) - Filter (0.25) = Filter Pressure Drop (inH_2O)	0.12	0.10
③ Before Eval Coil (optional) (inH_2O)	0.38	
Coil (0.38) - Supply (0.13) = Coil Pressure Drop (inH_2O)	0.25	0.20
④ Supply measurement (inH_2O)	0.13	
Supply Pressure Drop (inH_2O)	0.13	0.10



All the numbers are absolute. No (-) Neg or Pos numbers

All the numbers are absolute. No (-) Neg or Pos numbers

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12

Probe Placement - Outside

Split system

Outside

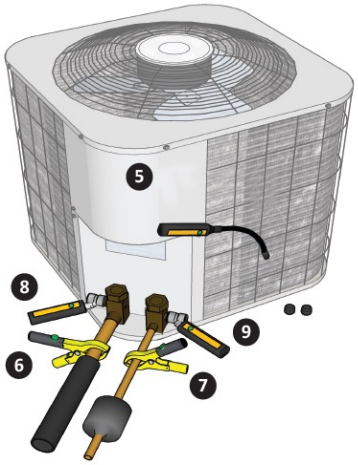
- Suction line temp. SLT and
- Liquid line temp. LLT -

~6 inches or close to service valve

- Suction line pressure (low) -
- Liquid line pressure (high) -

- Outdoor air temp ODA -

out of line of sight of sun and away from air flow from condenser



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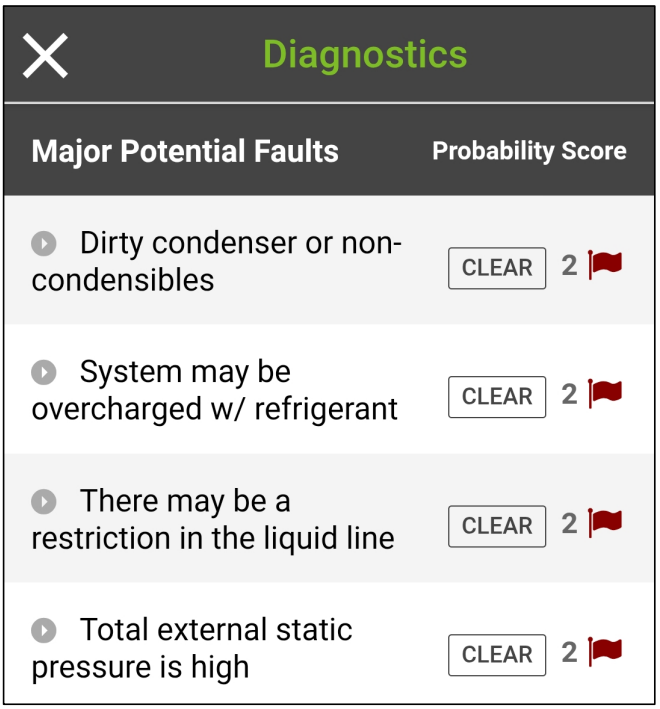
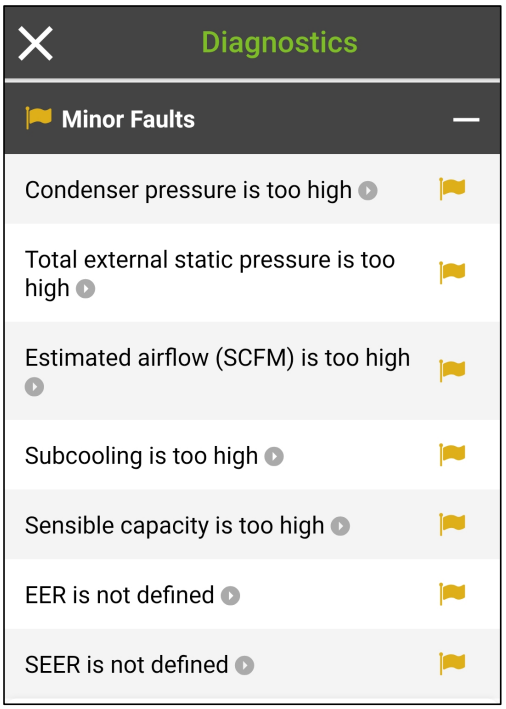
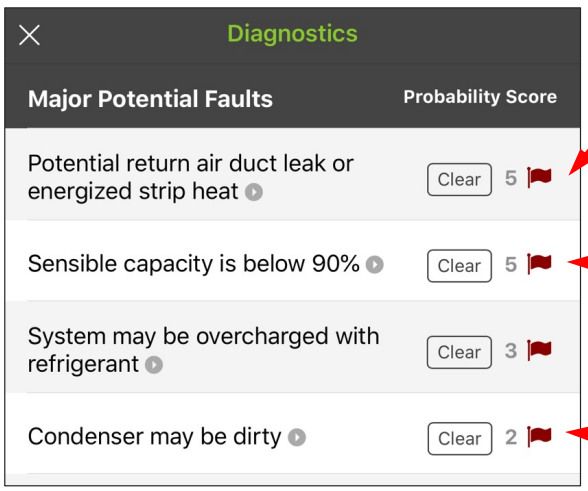
Diagnostics

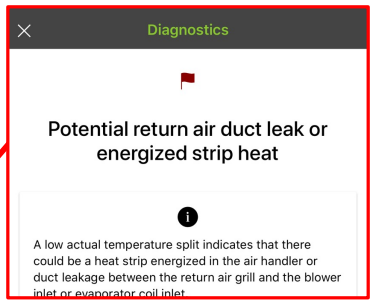


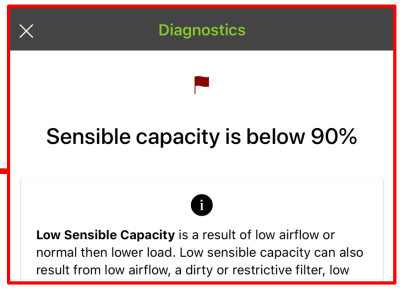


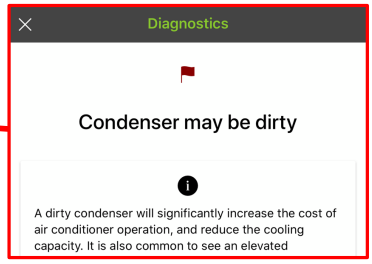
Just in Time Education

Tells you what to look for and how to fix it!









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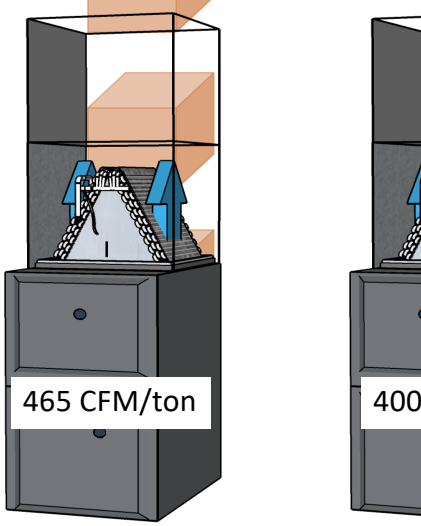
Premier Services

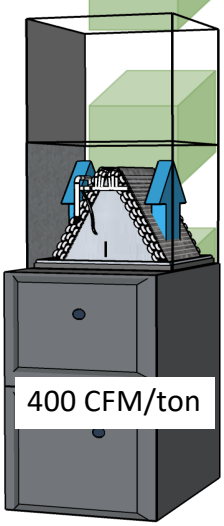
- Vitals Score®
- Pro and Vitals Reports
- AI Profiler
- Test Tracker (live streaming)
- Benchmarking
- Guided Workflows
- mQ Cloud Unlimited Storage
- CRM Integrations
- Unlimited Photos
- AccuTools Low Ambient Charging Solution
- ACCA QI *$ Addon

17

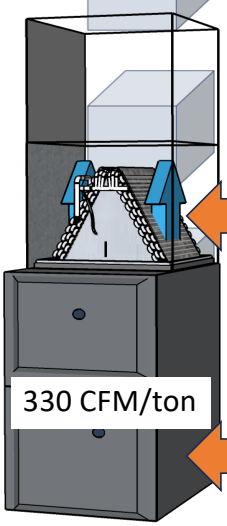
Creates Misdiagnosed Refrigerant Measurements



Minimal Time to Transfer Heat and Coil Bypass

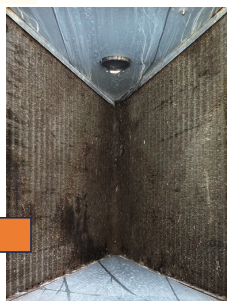


Designed Commissioned



Not Enough Time to Transfer Heat

Dirty Evaporator Coil



Dirty Filter

Dirty Blower Wheel

18

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The Fail Proof Process

Size → Seal → Forecast

conduit tech · Simply · aeroseal · T·E·C THE ENERGY CONSERVATORY

Select → Evacuate → Set Airflow

LG · BOSCH · MITSUBISHI ELECTRIC · DAIKIN · ACCUTOOLS · T·E·C THE ENERGY CONSERVATORY

Commission

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Prove it!

VERIFIED EQUIPMENT OPERATION · VERIFIED SYSTEM PERFORMANCE

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Thanks

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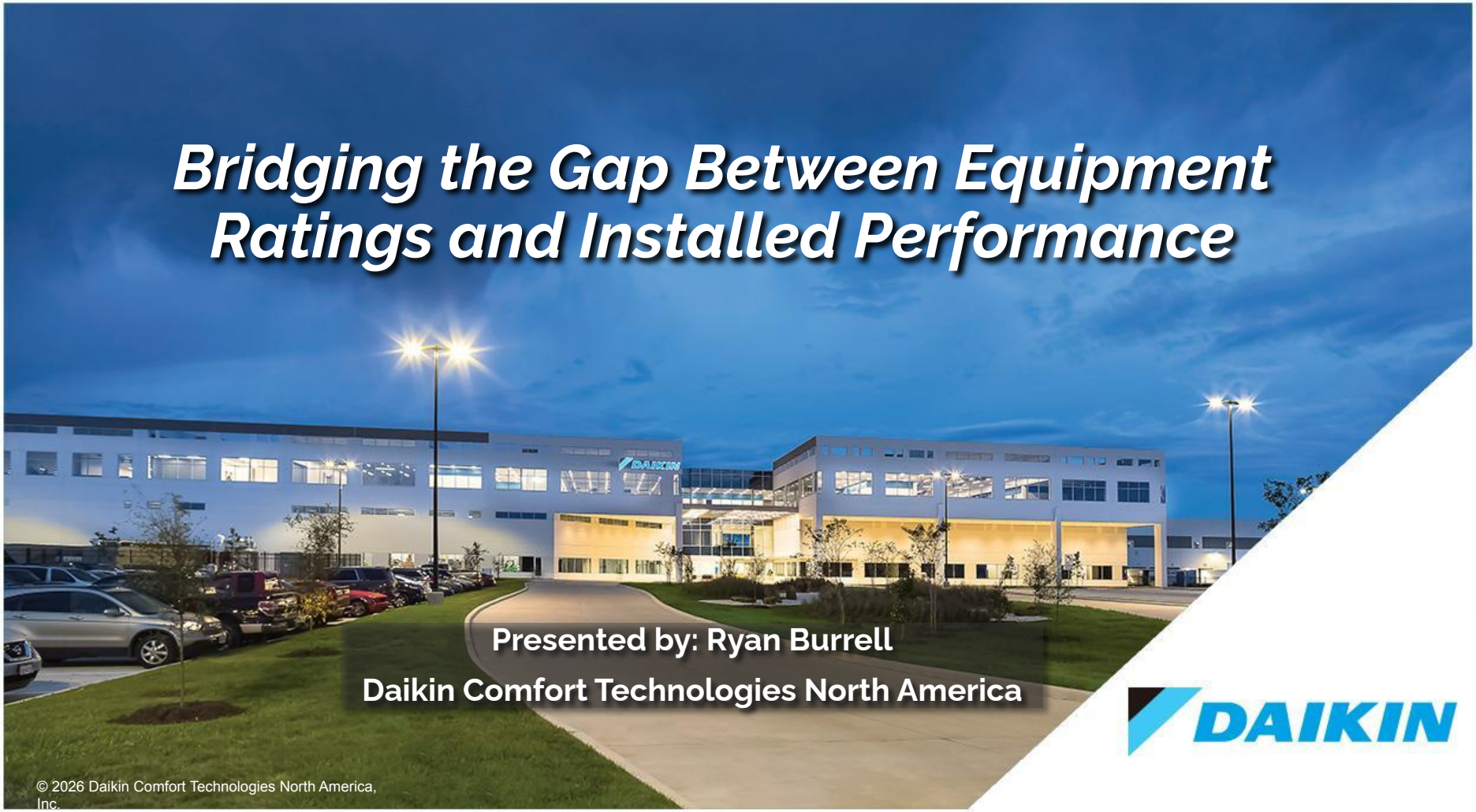
Bridging the Gap Between Equipment Ratings and Installed Performance



Presented by: Ryan Burrell

Daikin Comfort Technologies North America

DAIKIN

Speaker Bio

Ryan Burrell

Business Development Manager– Energy Efficiency & Electrification

Daikin Comfort Technologies North America

- **17+ years** experience in the HVAC, high-performance construction, and utility demand-side management. Specifically worked for HVAC equipment manufacturers the past 10 years
- Current role includes working with utilities and industry partners to advance utility demand-side management efforts through the **promotion of energy-efficient technologies** (such as inverter heat pumps)
- Holds BBA from **University of Georgia**'s Terry College of Business (2010)
- Past Board Member - **MicroLife Institute** (2021–2025)
- **Hobbies/Interests:** Soccer, Tennis, UGA, Boating, Fishing, Traveling, Thrifting & Mountain Biking

Past Certifications/Trainings Completed

- Air Conditioning Contractors of America/ACCA's:
  - ANSI/ACCA Standard 5 QI: HVAC Quality Installation
  - Manual J® (Residential Heat Load/Loss Calc)
  - Manual D® (Residential Duct Design)
  - Manual S® (Residential Equipment Selection)
  - Manual H (Heat Pump Systems)
  - Manual P (Psychrometrics)
  - Manual T (Air Distribution Basics)
- Building Performance Institute (BPI) Building Analyst & Envelope Professional (Certified Trainer & Test Proctor)
- RESNET HERS Rater
- DET Duct & Envelope Tightness Verifier (Certified Trainer & Test Proctor)
- EPA Universal 608 Technician (Trainer & Test Proctor)
- VRF/VRV Application & Design Specialist
- Ductless Heat Pump Installation & Service
- ITC Level 1 Thermographer

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A Mindset for Innovation

"Learning and innovation go hand in hand. The arrogance of success is to think what you did yesterday will be sufficient for tomorrow"

"Do not go where the path may lead; go instead where there is no path, and leave a trail" - *Ralph Waldo Emerson*

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The Performance Gap

Equipment Ratings Define **Expected Performance** and **Potential,**

Installation and **Operating Conditions** Determine **Delivered Performance.**

Equipment ratings are based on defined test conditions, matched components, using specific operating parameters

Installed systems operate in real homes with real duct systems, and are controlled by system optimization engineers a.k.a. real homeowners

The importance of the relationship between system performance and the duct system?

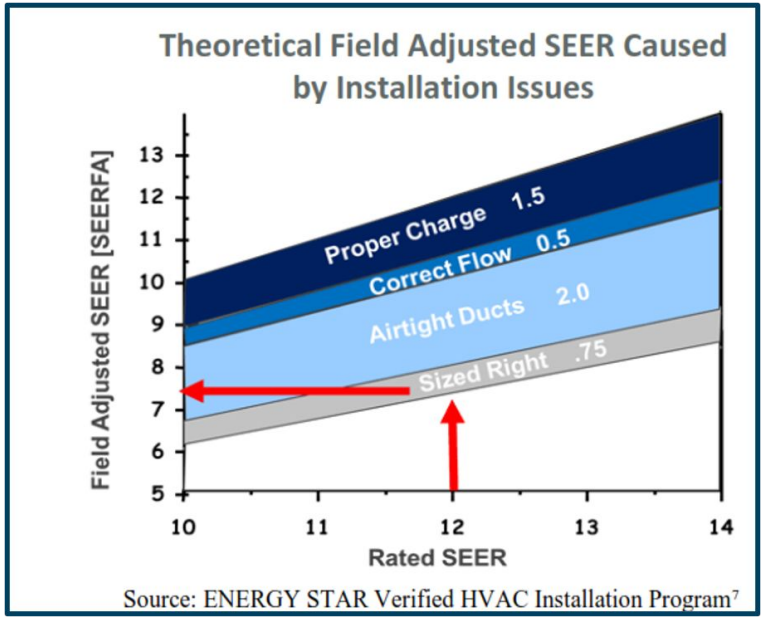
Since we love car analogies in our industry.....

1. If these two vehicles raced each other, who do you think would win?

2. If these two vehicles raced each other, but both vehicles had 4 flat tires; And both drivers were under the influence, who do you think would win?

Common Installation Faults and their impact on System Performance, Capacity, and Efficiency

- Equipment matching; equipment application; equipment selection
- **Airflow across the indoor coil; low airflow; high static pressure**
- **Equipment Sizing; Calculation of the load**
- **Refrigerant charge; methods to identify refrigerant line leaks or purging of the lines**
- **Undersized/oversized ducting; poor duct design; unbalanced airflow**
- **Duct Leakage; tightness; verification procedure, lack of duct insulation**
- Incorrect controller/t-stat setting configuration, balance points, dip switch settings; system mode or staging settings
- Incorrect materials or tools used during system installation
- Lack of system commissioning, measurements performed, and verification at startup
- Improper setup of emergency back heat strips on heat pumps



When does System Performance and Efficiency Deliver on the Equipment's Ratings?

High-efficiency HVAC equipment delivers on its "rated" potential when installed systems are properly designed, applied, configured, measured, commissioned, and verified.

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ACCA Standard 5 HVAC Quality Installation Specification

ACCA Standard 5 Quality Installation Specifications

ACCA
AIR CONDITIONING CONTRACTORS OF AMERICA

2800 Shirlington Road
Suite 300
Arlington, VA 22206

703.575.4477
Fax 703.575.8107

www.acca.org

ACCA Standard 5

STANDARD NUMBER: ANSI/ACCA 5 QI–2015

HVAC Quality Installation Specification

Minimum Design and Installation Requirements for Residential and Commercial Heating, Ventilating, and Air Conditioning (HVAC) Applications

Market Awareness

A significant market opportunity for improving the quality of HVAC equipment installations and service involves raising the awareness of consumers and building owners / operators about the benefits provided by professional contractors following industry-recognized quality installation practices (e.g., correct equipment selection, installation, and commissioning). Building owners / operators and residential consumers need to be informed of the links between comfort, humidity levels, utility bills, indoor air quality, and with a proper HVAC system design and installation. Once aware, consumers will better understand the value of a quality installation (QI) from their HVAC contractor. Consumers and building owners/operators who understand QI will also help position consumers and building owners / operators to consider the complete value-to-cost equation, not merely the "first price," when making HVAC equipment purchasing decisions. Customers who select contractors that promote QI and high performance HVAC equipment enjoy enhanced comfort, reduced energy usage, improved occupant productivity, and enhanced occupant safety.

4.1.2 ACCEPTABLE PROCEDURES

The contractor shall use one of the following acceptable methods for fulfilling the design criteria:

a) OEM CFM/ESP table method using an air differential meter (e.g., manometer) to determine the static pressure drop across a cooling coil, furnace, or fan coil unit, and compare with OEM values (use OEM wet/dry coil information as applicable),
or

b) Traversing using a manometer and probe or an anemometer per ACCA, AABC, ASHRAE, ASTM, NEBB, SMACNA, or TABB procedures,
or

c) Flow grid measurement method,
or

d) Pressure matching method[9],
or

e) The temperature rise method (for heating only at steady-state condition; gas or oil furnace, electric resistance heat, geothermal and water source heat pump) to verify proper airflow through the heat exchanger or heater elements. [NOTE: It is not acceptable to use the temperature rise method to determine cooling airflow over the indoor coil.]

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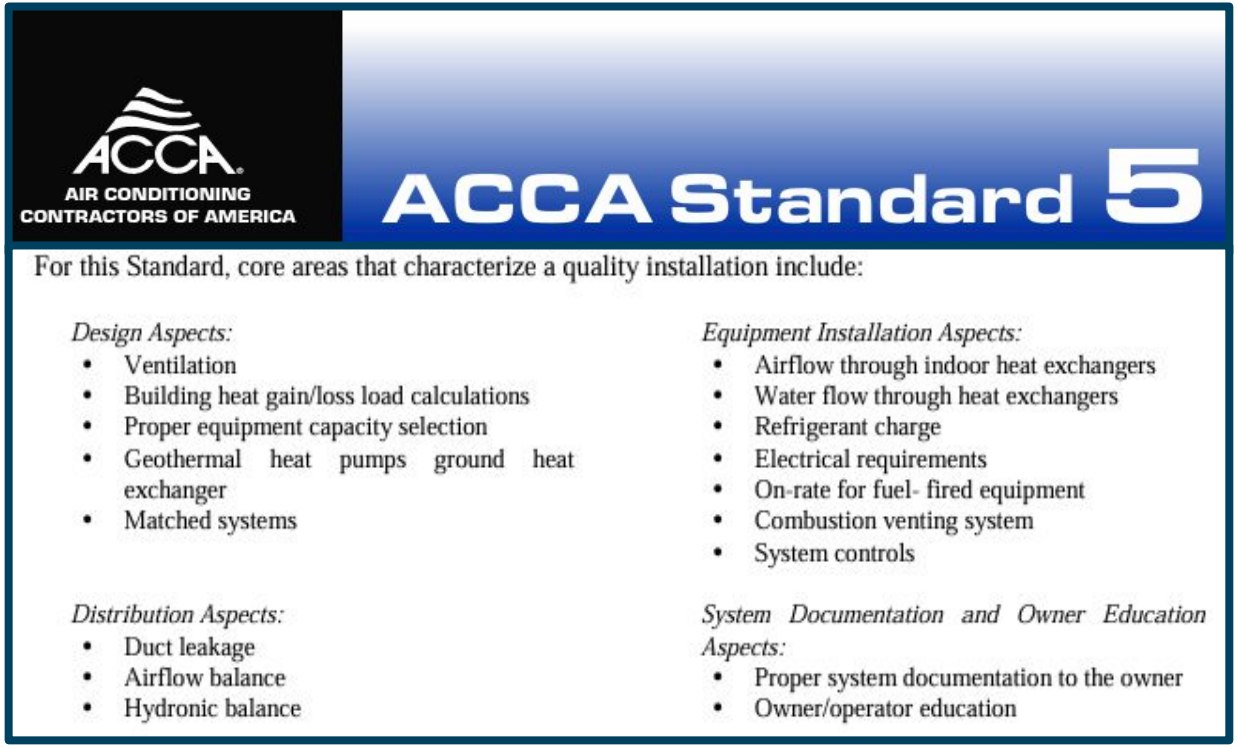
ACCA Standard 5 Quality Installation Specifications



Important Considerations Highlighted in the ACCA Standard 5 Design Aspect Specs

- Accurate Manual J room to room load calculations have a critical role in properly defining the space's CFM requirements within the Manual D Duct Design
- **Furthermore, these results are also critical in determining the space's sensible/latent heat ratio, which is the foundation for properly performing your Manual S – Equipment Selection**
- Duct leakage wastes conditioned air and can pull in attic or crawlspace air
- **Room pressure and airflow imbalance create comfort complaints**
- High static pressure increases blower effort and can restrict operation
- **In the Southeast, these issues often show up as humidity problem**

Southeast HVAC System Retrofit Realities

Cooling Capacity, Heat Pump Heating, Humidity, and Distribution

DAIKIN AIR INTELLIGENCE

Key Points

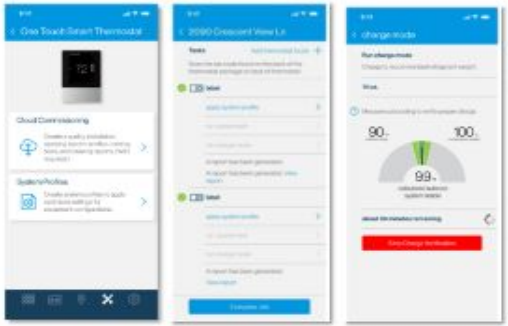
- Ducts are often in attics, crawlspaces, garages, or other harsh spaces in Southeast
- Duct leakage can add sensible and latent load
- Poor airflow can show up as humidity complaints
- Oversizing can shorten runtime and reduce the system's ability to properly remove moisture
- Heat pump Design Elements: Measuring airflow, controls configuration, balance points, staging, and auxiliary heat

Daikin System Capabilities and Future Product Innovations

Our Beliefs. Our Values.
Sustainability. Technology. People.

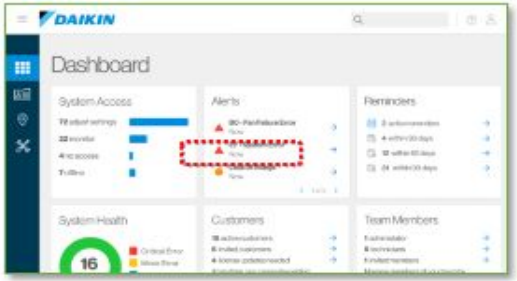
Daikin is a global technology company that unleashes people's unlimited potential to create superior indoor environments through advanced technology and sustainable practices, *Perfecting The Air We Share* for the greater good of the communities we serve.

Daikin One Cloud Services



Quality Install

Homeowner & Dealer Reports



Charge Integrity

Remote Diagnostics

Daikin One Cloud Services is a platform that enables Daikin dealers to take their installations and service to the next level.

Leveraging cloud connected equipment the Daikin cloud notifies Daikin dealers of installed equipment's maintenance and service needs, provides tools for quality installation verification, and access to system performance charts.

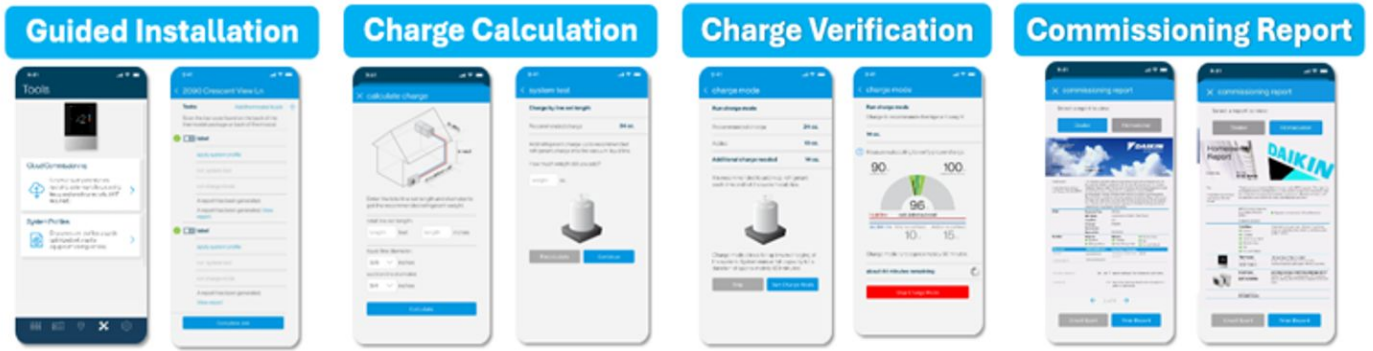
With homeowners' permission, Daikin dealers can view their customers' historical system performance and data. Cloud Services can increase homeowner satisfaction and peace of mind, by providing verification of a quality installation and a more efficient and seamless service and maintenance process which reduces unpaid visits and warranty claims.

Available on:

Download on Apple Store
Download on Google Store
Website

DAIKIN

System Performance Tools



HVAC and Indoor Air Quality Solutions for your Home:

Daikin ONE Ecosystem Website

Service Tools & Contractor Training

Daikin Tech Hub

Daikin Tech Hub app provides Daikin technical and service information for contractors.

Training Webinars

Live and recorded webinars offer information on new products, technical data, sales training with the latest information in the HVAC industry.

Daikin XOi Program

XOi's Daikin Program saves techs countless hours on site, makes every install and fix consistent, and gets the work done right the first time.

Interplay Learning

Interplay Learning has been building better training, better careers and better lives for our customers and their employees.

High Performing HVAC system installations are produced by installers & techs who:

- Possess the appropriate knowledge, tools, and materials to perform the installation
- Don't cut corners
- Know the importance of a properly designed, sealed, and insulated duct system in relation to the overall equipment's performance, capacity, efficiency and lifespan
- Take the time to measure and verify their results

NEIF EnergyPlus Financing

Simple Interest, Low Monthly Payment Options for Energy Efficiency, Battery Storage & Most Types of Home Energy Improvements

For Home Energy Contractors

Matthew H. Brown
Managing Member
NEIF
mbrown@neifund.org

NEIF Consumer Financing

- The Basics
  - NEIF offers an unsecured or equipment secured consumer loanEasy use for contractors and applicants
  - Quick credit pre-screen and decisions
  - Integration with utility or state sponsor programs
  - Fast payment to contractors

- National Energy Improvement Fund is an energy-focused lender that lends to homeowners and businesses seeking to upgrade the efficiency of their facilities.

- Our goal is to help contractors increase their sales of energy

SIMPLE · TRANSPARENT · EXPERT · **TRUSTED**

1

"Know Before You Go" Credit Pre-Screen and Easy Application

- You can credit pre-qualify your customer with just a name and address - know before you go!
- Won't impact customer credit.
- To have your customer apply give them monthly payment options and use your company's custom NEIF Financing Gateway on your phone, tablet or website.

2

Instant Credit Decision We Take Care of the Details

- Your customer will receive an immediate credit decision and you can view it instantly on your NEIF Contractor Portal. We will also email you and your customer.
- Upload a picture or PDF of customer contract or proposal to their NEIF Contractor Portal as soon as possible.
- Our Energy Lending Specialists assist the customer and contractor to expedite final approval and funding

3

Fast Contractor Funding

- Electronic loan docs are sent directly to the customer upon final approval, typically as soon as the contractor's proposal has been uploaded.
- Contractor can review the status of customer applications at any time by logging into their portal.
- Customer and contractor electronically sign off on job completion.
- NEIF funds contractor directly via ACH within 2 business days.

SPECIAL LOW-PAYMENT FINANCING FOR

GENERATORS & POWER SOLUTIONS

UPGRADE YOUR HOME'S POWER & COMFORT, AFFORDABLY

The National Energy Improvement Fund (NEIF), a U.S. DOE Home Improvement Expert Partner, offers **trusted, fixed-rate, low monthly payment EnergyPlus financing** for Briggs & Stratton generators & battery storage systems that keep your home efficient, healthy, safe, and comfortable. All work must be installed by a NEIF-Approved Contractor to qualify.

- GENERATORS & BATTERY STORAGE
- HEATING/COOLING, ELECTRICAL, PLUMBING
- AIR SEALING & INSULATION
- OTHER ENERGY & RESILIENCE UPGRADES
- 100% FINANCING OF PROJECT
- NO PRE-PAYMENT PENALTIES
- NO LIEN FILED ON YOUR HOME
- FINANCING FROM $2,500 — $50,000

1. **Choose the payment that fits your budget.** You can pay off early or pay ahead with no penalty.
2. **Apply to NEIF for an instant credit decisions** by scanning our QR code below.
3. **Sign electronic loan documents from NEIF.** NEIF pays your contractor when the work is completed to your satisfaction.

EnergyPlus FINANCING

True Fixed Rate & Payment

- **Fixed low monthly payment** Up to 12 year term at 8.99% rate for qualifying borrowers*.
- **Loan may be pre-paid at any time** without penalty.

	36 Months	60 Months	120 Months	144 Months
$2,500	$79	$52	$32	-
$5,000	$159	$104	$63	-
$7,500	$238	$156	$94	-
$15,000	$477	$311	$190	$171
$25,000	$795	$519	$317	$284
$35,000	1,113	$726	$443	$398
$50,000	$1,590	$1,038	$633	$569

*As of August 2025. All loans are made directly to the consumer by National Energy Improvement Fund, LLC. or its lending partners. Rate and maximum loan amount based on borrower's credit.

BRIGGS&STRATTON ENERGY SOLUTIONS

NATIONAL ENERGY IMPROVEMENT FUND (NEIF)

Energy Home Improvement Financing

BRIGGS&STRATTON ENERGY SOLUTIONS

EnergyPlus HOME IMPROVEMENT FINANCING From NEIF-a Certified B Corp

ALL IMPROVEMENTS

	PLAN 1- EnergyPlus Low Payment FINANCING Fixed Rate up to 12-Years, **Low Flat Dealer Fee** ($100)		PLAN 2 – 0.00% - "Best of Both Worlds" FINANCING Fixed Low Payment 5 Year with **True 0.00% for 12 Months**
Dealer Fee	$100 flat funding fee per loan (funded only)*		6.99% of loan amount dealer buydown fee on funded loans*
Credit Tier	**Tier 1** 700 Plus	**Tier 2** 680-699 / 640-679	• **True 0% APR for first 12 months**, no accrued or deferred interest. Fixed payment based on 5 -year term (only) at 8.99% rate for Tier 1 and 14.99% rate for Tier 2. • All payments in first year go toward principal, effectively shortening the term. If paid off within the first 12 months, there is no interest due. Interest charges will begin on the outstanding balance after the first 12 months. There is no deferred or accrued interest
Available Terms	36, 60, 120 mos.- all amounts 144 mos. - min $10k	36, 60, 120 mos. all amounts	
Customer APR	**8.99%**	14.99%	**0.00%** for 12 Months. **8.99%** thereafter (14.99% for Tier 2) **6.14% APR** if paid to full term for Tier 1, 10.77% APR for Tier 2
Standard Loan Amount	$2,500 to $50,000	$2,500 to $35,000 / $2,500 to $25,000	Standard Loan Amounts per Credit Score
Pre-Payment	The loan may be prepaid at any time without penalty.		
Income Verification	**Stated, No verification of income*** *Income verification may be required for credit scores of 1) below 680 with an amount above $5,000 and 2) all amounts above $25,000.		
Terms & Qualification	Simple interest, fixed rate, installment loan. Credit Qualification based on lower of applicant's and co-applicant's (if applicable) credit scores. No bankruptcies in last 5 years. Debt to Income (DTI) less than or equal to 50%, 42% for loans greater than $25,000.		
Qualifying Properties	**Owner-occupied primary residence or vacation home** 1 to 4 unit on permanent foundation. No lien is placed on the home. There is a security interest in the improvement being financed.		
Eligible Improvements	Generators & Battery Storage; Air Sealing & Insulation; Electrification; Heat Pumps (Air Source, Ductless, Geothermal) & Central AC; Oil/Gas/Propane/Biomass Boilers & Furnaces; Plumbing, Water Heating & Water Conservation (incl Kitchens & Baths); Roofing & Siding; Windows & Doors; Solar; Other Efficiency & Resilience Improvements Entire project may be financed if at least 50% of the work includes qualifying energy improvements.		

*Funding Fees and Dealer Buydown Fees netted from amount funded to contractor.. All loans are made directly to the consumer by NEIF or on behalf of its funding partners for work performed by NEIF-Approved Contractors. Contractor is paid in full upon satisfactory completion of job. Rates subject to change. Loan may be declined or subject to further review if underwriter determines that FICO score or other factors are inconsistent with actual credit profile. 081525

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1

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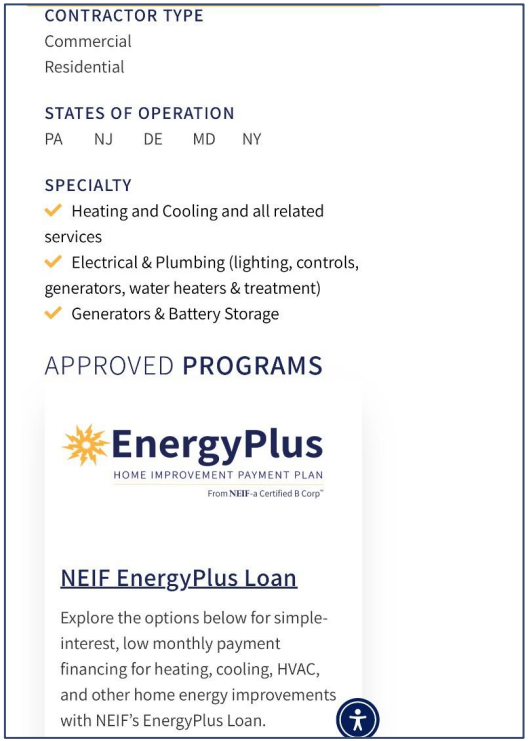
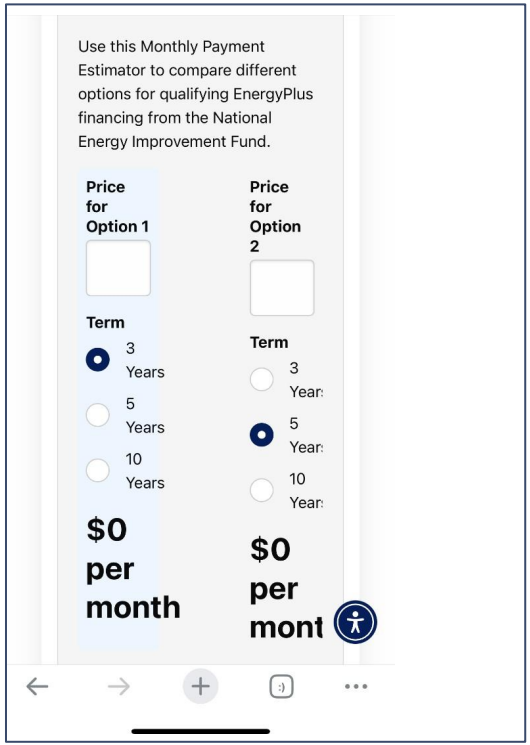
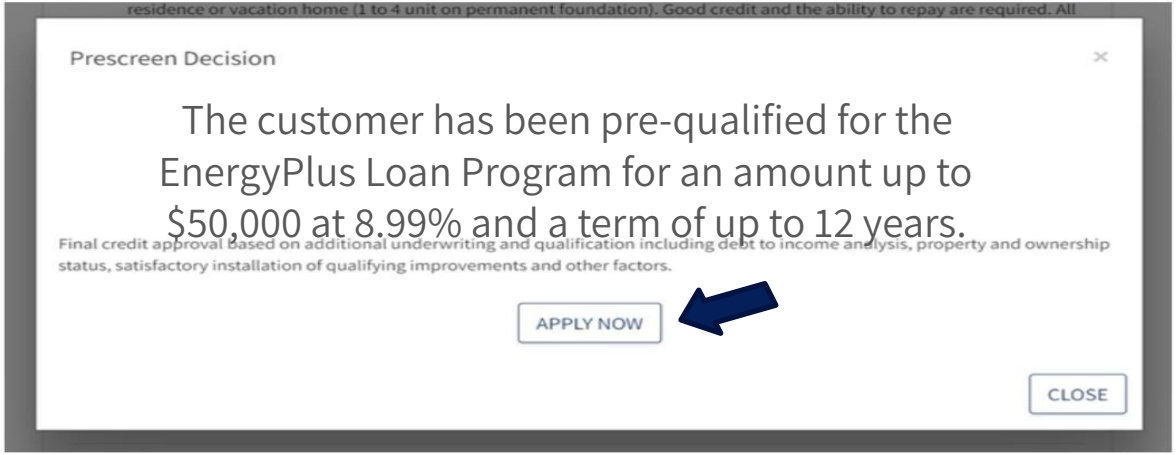
Use Your Company's Custom NEIF Financing Gateway on your Website or on your Phone in the Home



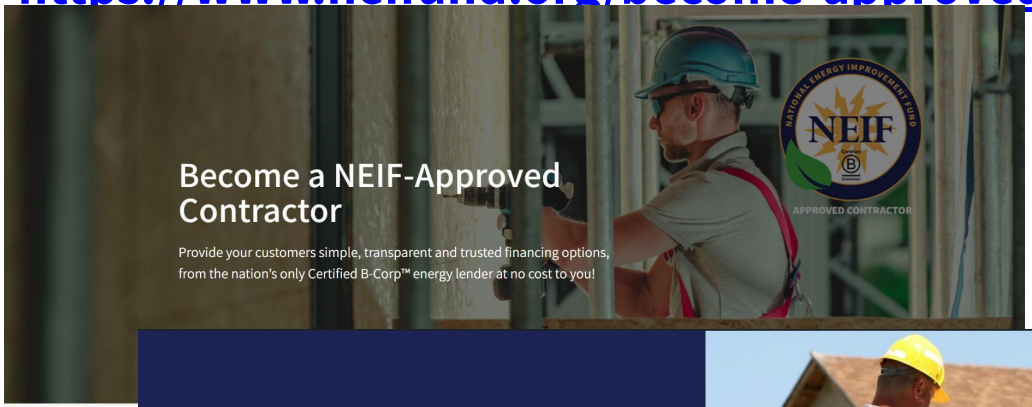


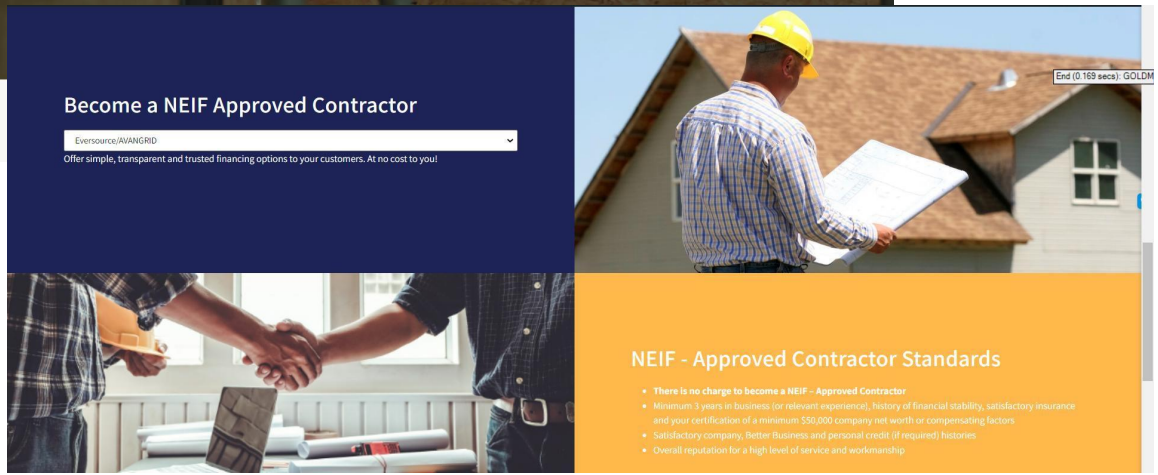
Use Your Instant Credit Pre-Screen link to know if a customer meets minimum credit score standards before you visit the house. (Final approval based on actual app)



The instant credit pre-screen is intended for use with NEIF EnergyPlus Loan and not for loan products from other lenders. It is the mutual understanding between NEIF and our Approved Contractors that if an applicant successfully passes the pre-screen that they will be first offered the EnergyPlus Loan monthly payment option from NEIF, and only offered credit from other lenders if they do not qualify through NEIF. Contractor usage of the pre-screen tool is at the discretion of NEIF.

https://www.neifund.org/become-approved-contractor/





Thank You

SMART ENERGY. STRONG ECONOMY. FOR ALL.

WWW.SEEALLIANCE.ORG