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If You Don't Measure, You're Just Guessing!™

Fall Preparation



ALSO IN THIS ISSUE:

- Four Air Diagnostic Tests to Help Pinpoint Comfort Problems
- Strategic Planning: Measuring TESP's, OKRs, and KPIs
- The Next Generation Approach to Air Upgrades™

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TECHNICAL:

The Next-Generation Approach to Air Upgrades™

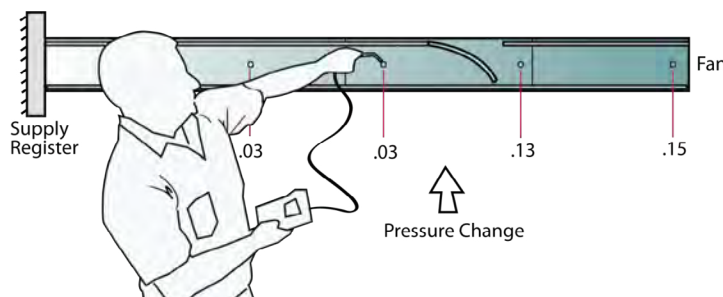
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Four Diagnostic Tests to Help You Pinpoint Comfort Issues

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Strategic Planning: Measure TESP to OKRs and KPIs

High-Performance HVAC requires you to have a strategic plan - not just for the testing side, but the business back-end that supports testing.



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Recharge Your Batteries:

Eight Ideas to Help You Get Ready for Fall



Mike Weil is editor-in-chief and director of communications and publications at National Comfort Institute, Inc. Contact him at ncilink.com/ContactMe.

As Fall approaches, it may be time to slow down a bit to catch your breath and take some steps to ensure you, your team, and your company are ready to meet the upcoming heating needs of your customers.

First and foremost is the need to give your team a break. This summer has been weirdly hot and your technical staff most likely was running in supercharge mode to keep up with the demand. Now is the time to let them plan some **down-time to recharge**. The same applies for you. Slowing down helps you reduce stress, increase productivity and more. It helps to get you ready for the next season's worth of challenges.

As you "come back online," think about some strategies that can help you in the near future. Here are just a few ideas to consider:

1. Plan for staff vacations — Be sure to schedule vacations in a way that enables everyone to take some time off without interfering with company operations.

2. Staff Training and Scheduling — From a **fall training** standpoint, shoulder seasons are ideal for getting your techs up-to-speed on the latest equipment and technologies. Fall is especially a good time to focus on heating system training, procedures, and products.

From a **scheduling** standpoint, fall is excellent to adjust staffing schedules from the fast paced of summer emergencies and installations, to increased demand for maintenance and repairs.

3. Promotions — Fall is also the perfect time to revisit **promotional discounts** on maintenance services to encourage appointments.

Create **bundled service packages** that include things like inspections, equipment cleanings, and minor repairs to help customers get ready for winter. This could include system

checks and upgrades.

Don't forget about your **marketing and advertising campaigns**. This includes planning for and attending local home shows.

4. Customer Outreach — Prepare and send **emails or newsletters** to remind customers about the importance of fall maintenance. You can include any promotions in these communication pieces as well.


5. Customer Education — **Educating customers** is a good idea. You can organize workshops and seminars for free on the importance of system maintenance, testing and measuring system performance, and even energy savings tips for fall and winter. Don't forget about **home shows!**

6. Emergency Preparedness — This is something that more contractors should think about. Do you advertise your **emergency services** and is your staff ready to handle calls during unexpected cold snaps?

Consider backup plans for **supply chain disruptions** (remember the COVID pandemic) or unexpected spikes in service demand. Do you have such plans?

7. Inventory Management — Make sure you restock common replacement items like filters, thermostats, and furnace components. Fall is a great time to spend more time with your suppliers to **strengthen relationships**.

8. Branding and Process Reviews — September is a great time to review with your team AND customers your internal process and work together to improve them. This helps keep **your brand and culture** sharply in focus.

Slowing down and recharging will help you proactively prepare for fall and winter. It's a time to fine-tune and get ready to meet customer needs, improve customer satisfaction, and keep your team energized. Are you ready? 



SPONSOR Highlights

Embracing High-Performance HVAC™

High-Performance HVAC™ contractors know the key to successful troubleshooting and system optimization lies in precise measurements and reliable data.

Acquiring accurate airflow measurements is a critical aspect of your work. Poor airflow can lead to inefficient systems, higher energy bills, and uncomfortable living conditions for clients. It can even damage equipment. Having the right tools to perform these measurements accurately and efficiently is essential for every HVAC technician.

With the ongoing scarcity of technicians in the HVAC community, building up new talent and handing them a tool like [The Energy Conservatory](#) (TEC) [Digital TrueFlow® Grid](#) can

be a time saver. We design TEC's products to make your job easier and more effective. You can quickly identify and fix issues with the right tools, improving




your service quality and customer satisfaction.

TEC designed the Digital TrueFlow Grid to simplify measuring airflow and

understanding the results. Providing precise readings quickly and easily eliminates the need to hunt down installation manuals that are typically hard to understand or source.

This tool is not just for high-end projects; it's practical and beneficial for everyday HVAC work. At TEC, we are dedicated to providing innovative solutions that help you better perform your job.

Come see the **TEC Digital TrueFlow Grid** at [National Comfort Institute's 2024 High-Performance HVAC Summit](#) which is being held in Asheville, NC, this September (10-13). We look forward to seeing you there. 

— by Steve Rogers, President,
The Energy Conservatory

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 SCAN ME

Picture Rocks Cooling: Airflow is The Secret Sauce

Picture Rocks, Arizona, is located in Pima County. A like-named mountain is there, guarding the eastern border of the north Tucson Mountain foothills. Here, you can find an area with hundreds of petroglyphs from what is known as the [Hohokam](#) era and before, carved into the rocks.

Picture Rocks is also home to a High-Performance HVAC™ contracting company of the same name, started in 2001 by Ron Arenas. Before opening his company, Ron worked for several small HVAC contracting firms in the area.

“Eventually,” he says, “I decided I wanted to serve the community better and give them the best service possible.”

In the early days of [Picture Rocks Cooling, Heating, and Plumbing](#), Ron says he mainly worked alone.

“I would usually pick up one or two helpers during the summer and employ them from April through September.”

PICTURE ROCKS TODAY

From those humble beginnings 23 years ago, the company today operates three service vehicles, one installation truck, and two plumbing trucks. Picture Rocks employs 15 people, and Ron says he hired a full-time marketing person for the first time last year.

“We should do just under \$4 million in sales this year,” he says.

Ron Arenas adds that their focus is residential, though Picture Rocks also does some light commercial work.

“We don’t do any new construction,” he adds. “We used to. We used to work with some small general contractors who actually paid! But those guys aren’t around anymore.”

“So, we pretty much stay away from new construction. We do some light commercial accounts, mostly maintenance, and some repairs or replacements. On the HVAC side, 90% of our work is residential.”



Janay and Ron Arenas

Concerning maintenance, Picture Rocks currently has around 500 agreements in place today, though Arenas says they want to improve this. In 2024, he says they’ve had more success selling them.

On the plumbing side of the business, they recently added a plumbing inspection into their agreements. Arenas says, “During the summer, when plumbing is NOT so busy in Tucson, our plumbers will do plumbing inspections. This gets our team into

houses one more time and could potentially lead to more work.

“They can go through the whole house looking at anything from a leaky pipe under the sink, a hose bib, or replacing an old water heater,” he says.

THE TRAINING CONNECTION

Arenas says that a big part of Picture Rock’s success is because they have a culture of training.

“Our team trains every other week. This training covers service or sales. We even train how technicians should walk up to a customer’s home because that could make or break the whole service call.

“We focus on how they present themselves. Everything rests on that first impression. We want to ensure that everything is how it’s supposed to be from the very start,” Arenas explains.

As a member of [EGIA](#) (Electric and Gas Industries Association), Arenas says they have access to and use sales and technical training, customer service representative, and leadership training. On the HVAC side, their [National Comfort Institute](#) (NCI) membership provides them access to High-Performance HVAC™ training.

“I aim to get our field service and installation teams to understand airflow and measure/test it. We have six members of our team who have completed CO (carbon monoxide) and combustion safety, as well as airflow and duct optimization classes.



“The goal is for all our HVAC techs to test static pressure on every job. We are not there yet. But it is the reality of our world right now. They sometimes can’t get to it.

“However, airflow and pressure testing paint a picture of why the HVAC system isn’t working to its full potential or why there are some problem spots in the house. It’s almost always due to airflow,” Arenas continues.

STAYING ON TOP OF TECHNOLOGY

“I don’t know what it’s like in other parts of the country, but in Tucson, probably 70% of the houses have restricted returns. Those returns are just too small for the system. And much of it has to do with ducts designed for R-22 systems. Back then, you could abuse R-22 systems by not providing correct airflow, but they still worked well. But 410A refrigerant is much more sensitive.”

Ron says that he works hard to keep track of changes that impact his company and his customers. The big one is the advent of [A2L refrigerant-based HVAC equipment](#) resulting from new Federal standards calling for eliminating 410A refrigerants.

He explains that though his equipment supplier (Daikin) has not yet begun distributing their new A2L-based condensers in the Tucson area, he knows that it is coming and coming soon.

“We have been preparing for the new equipment for some time now. We’ve done some video training. Plus, our technicians recently went through a class taught by Daikin on [R-32-based A2L refrigerants](#).”

He adds that, eventually, the new equipment will also impact their high-performance testing processes.

AIR UPGRADES AND DUCT RENOVATIONS

Arenas says, “We offer [duct renovations](#) and [air upgrades](#) a lot. Customers don’t always take advantage of it, but we offer duct renovations on most system replacement projects. We also offer it when the system really needs it.”

Customers don’t always take advantage of this service, and Arenas thinks they should. But he knows that most consumers in his market area don’t understand what duct renovation and air upgrades are and are put off by the cost.

“Especially this year,” he says. “With

the economy being what it is, people are trying hard to hold onto their money. In 2023, things were tight, but this year they are even tighter.”

Interestingly, Arenas says the Tucson market hosts several bigger contracting companies that do similar work with airflow upgrades, duct sealing, etc. He also says the market is flooded with unlicensed contractors or one-truck companies that don’t invest in training.

“They don’t understand airflow or the impact it has on comfort. So, when a customer tells them about what our guys say, those contractors tell them that it’s either a rip-off or they don’t need it,” Arenas says.

“So, we have to shoulder a process to train our customers about the difference between testing and measuring and NOT doing those things. We must get better at explaining why it costs more for us to do this type of work. This is one of the reasons we finally hired a marketing person.”

ATTRACTING A YOUNG WORKFORCE

For Picture Rocks, Ron Arenas says their focus on air upgrades and duct renovations began slightly less than

five years ago. However, adapting to the strategy and learning about the technology wasn't as hard as he thought. But he says he feels the reason for that is that the company has a relatively young team.

"They're all about the technology," he says. "They love all the different digital measuring instruments. They love how they can pull the data up on their phone."

He says this wasn't an accident. He began actively working to attract younger people five or six years ago.

"At that time, most of my technicians were over 45 years old, getting burnt out and beaten up. I started a kind of technician farm system by bringing in kids right out of high school and training them. I was setting up a next-man-up approach, and as soon as these youngsters were ready, we put them in a truck and got them going."

Today, he says his lead installer is in his 40s, but nearly all the technicians are under 30.

His secret sauce? Developing good relationships with several local high school football coaches.

"That's become my pipeline. I try to get kids from high school football because they're already used to waking up early. They're already on a sched-

ule; they must work out and go to practice. Because they're playing on a team, they already understand assignments. It just works out well. The kids are already acclimated to working on a team, and Picture Rocks is most definitely a team environment."

THE NCI CONNECTION

Since they began learning more about High-Performance HVAC™ in 2018 or 2019, Arenas says he has seen a noticeable improvement in their installation projects.

"I can't emphasize this enough," he says. "Once we began getting airflow right, customers' systems worked correctly and efficiently. Proper airflow is the best thing for the customer. We now get more second-opinion jobs on someone else's installation because it's not working correctly. There, too, we often find airflow is the root of the problem."

Arenas says that this helps Picture Rocks get even more business. He adds that customers can see that his team can prove that they know what they are talking about and can show them what is happening with their system.

"NCI has a motto that says, *'If You Don't Measure, You're Just Guessing™.'*" That is so true. So many HVAC

companies don't do the testing, so many systems don't perform correctly.

"We're NOT guessing," Arenas adds. "We test, measure, and exactly determine what's happening and then correct it. We can ensure customers get what they paid for in terms of comfort and efficiency. The bonus is that a well-performing system lasts longer, especially if the customer has regular maintenance performed on it."

"Install the system right, make sure it has proper airflow and the right refrigerant charge, and then it is maintained. Then, it will be a long-lasting system," Arenas says.

SPREADING THE WORD

"Our approach with marketing is now completely proactive. Our new marketing guy talks about services that are appropriate for the season. In the spring, we talk about duct cleaning and duct sealing. In winter, we talk about plumbing, water heaters, and pipes. And then, it's all about air conditioning during the summer," he explains.

The marketing manager handles all of the company's digital marketing. Arenas says he also goes into the community to network and meet one-on-one with people. That means he takes people out to lunch, stops by installa-



tion sites, takes videos and pictures of the projects, and posts them online.

Arenas adds that their marketing and sales approach is to walk customers through what they do.

“We provide them with as much detail on what issues we find and what we propose to do about it in our proposals,” he says. “We often include illustrations in the proposals to help them understand.”

FINAL THOUGHTS

When asked what the biggest takeaway from his High-Performance HVAC contracting experience is, Ron Arenas says that it is something that HVAC contractors should embrace.

“Comfort systems today are getting more complex, more sensitive, and



if left alone, can fail in many ways,” he continues. “Knowing how to do a proper diagnosis, understanding the need to have proper airflow, and being able to make corrections to achieve that airflow is central to success.


“If you lack proper airflow, nothing else will work. As technology changes, it becomes more sensitive and complex. So you and your team need more

training. And the team at NCI are our go-to trainers regarding system performance,” he concludes.

For these reasons and more, **High-Performance HVAC Today** chose to shine the *August 2024 Contractor Spotlight* on **Picture Rocks Cooling, Heating, and Plumbing**. Congrats to Ron Arenas and his team. **NCI**



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The Next-Generation Approach to Air Upgrades™

If you're a regular reader of **High-Performance HVAC Today**, you know most HVAC systems suffer from poor airflow along with high static pressure. Many contractors panic when they first learn about this widespread issue and what it would mean to rip out every duct system and start over.

How many of your customers will want to invest in an upgraded duct system when they're also likely facing an expensive equipment repair or replacement?

Fortunately, there's another solution that lets you easily identify the primary causes of high static pressure and low airflow. Then, you can

recommend targeted repairs to address issues.

These repairs focus on the most accessible and impactful opportunities to streamline the job for relatively minimal material and labor costs.

You can also demonstrate the value of these repairs to your customers through measurement before and after the job is complete. This combination allows you to charge a fair price for the value you're providing at a profit margin that will help your company survive and thrive.

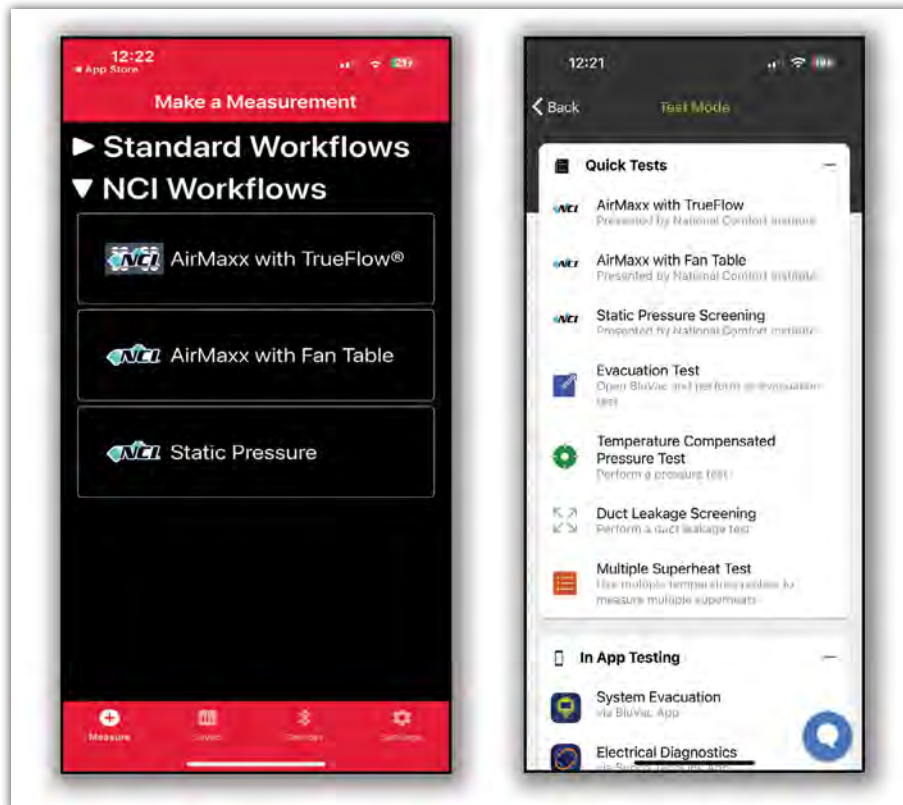
The **NCI (National Comfort Institute) Air Upgrade™** process does just this. It provides additional revenue on a typical job ranging from \$2000 to \$3000 at a gross profit margin in the

60% to 70% range. The best part is static pressure and airflow issues are so prevalent that you could be adding this high-profit revenue stream to most of your equipment repair and replacement jobs.

You'll serve your customers well and give them the comfort and peace of mind that has eluded them for years.

Plus, you will simultaneously strengthen your business and give your technicians and salespeople a source of pride in their work.

It's a win-win-win, and those types of opportunities don't come



NCI AirMaxx™ Workflows in the mQ® (right) and TrueFlow® (left) apps.

along often. Because Air Upgrades™ reduce expensive callbacks and complaints, your customers actually receive what they were promised!

NEW TOOLS TO HELP YOU

NCI has taught this approach for years in its [Airflow Testing and Diagnostics](#) class, but now there's a brand new set of tools to help you complete the measurements and pinpoint problem areas more easily and accurately than ever before.

They have partnered with [The Energy Conservatory](#) (TEC) and [measureQuick®](#) (mQ) to offer [NCI AirMaxx™](#) testing within each partner's app.

Both apps wirelessly connect with The Energy Conservatory's highly accurate [Digital TrueFlow®](#) and [DG-8 pressure gauge](#). These revolutionary tools move beyond airflow estimates with manufacturer blower tables to a true measured flow, that helps customers understand why they need an Air Upgrade™.

A direct airflow measurement is a powerful sales tool and proof your work achieved the objectives.

Don't have a TrueFlow® Grid? No worries. The measureQuick app supports other wireless digital manometers, and both apps support manual data entry if you want to try them out and don't have a compatible tool.

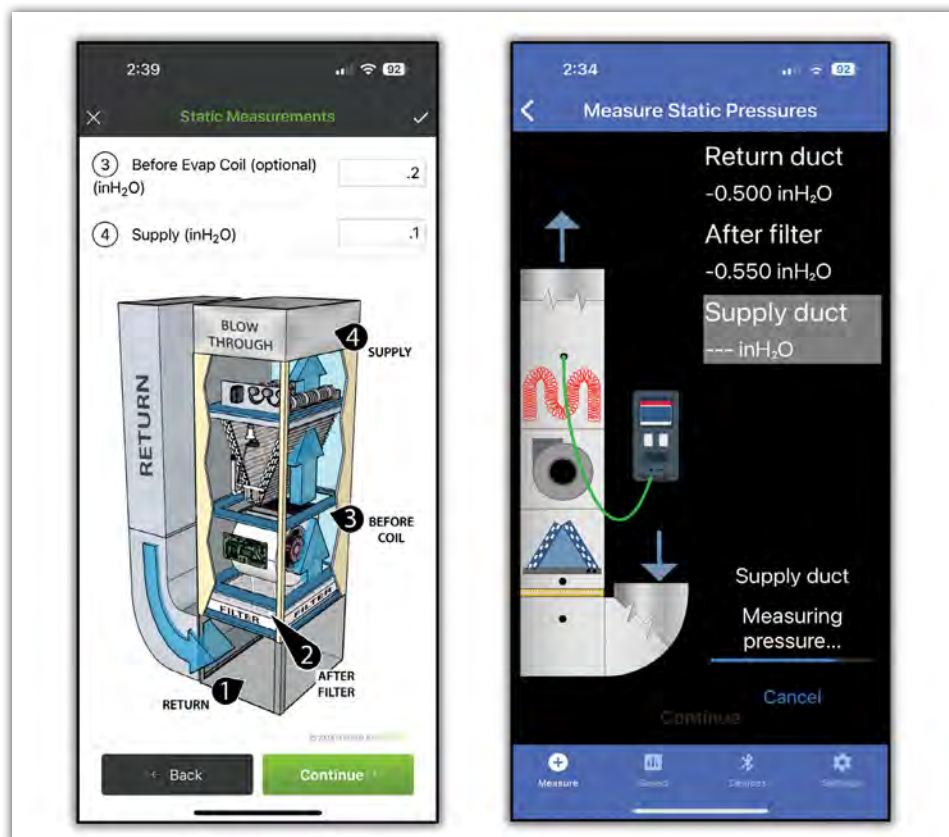
While these options won't be as accurate as TEC's instruments, they are valid for initial screening or if you're just getting started with static pressure and airflow diagnostics.

With these new tools, Air Upgrades™ are more within reach for your business than ever before. In case you're not familiar with what a typical air upgrade looks like, here's an example:

1. Generate Leads: On every service call or comfort consultation, a

technician will perform either a basic static pressure screening, an AirMaxx™ with Fan Table test, or an AirMaxx™ with TrueFlow® test using either the TEC or mQ apps.

If they start with one of the more basic tests and find that static pressure is high or estimated airflow is low, it's time for a selling technician or comfort advisor to come in with a TrueFlow Grid. This is a potential qualified lead in every home that you visit.



Measuring static pressure with the mQ (left) and TrueFlow (right) apps.



2. Bid and Sell: Armed with the TrueFlow® and either the TEC or mQ apps, a selling tech or comfort advisor can show the customer that their equipment has airflow problems and what some of the issues may be.

Based on the in-app diagnostics and on-the-ground visual observations, the tech can then draft a scope of work which may look something like this:

The TrueFlow grid is inserted into the filter slot to prepare for an airflow measurement (See picture above).

Equipment Improvements:

- Rework **filter system** to reduce filter pressure drop
- Provide basic **system cleaning** – blower and coil (coil in place)
- Test, adjust, and **set fan speed**
- Re-adjust **refrigerant charge**
- Verify **test-out** static pressures and fan airflow.

Duct System Improvements:

- Add **one oversized return duct and grille** from the return side of the equipment into a large open area of the home

- Replace **three or more six-inch supply ducts with eight inches**, or add new supply ducts with balancing dampers as needed
- Seal **duct leakage** to reduce airflow loss
- Add **required strapping** to support the duct system
- Replace **restrictive duct fittings** and transitions.

Using the *Air Upgrade™ Price Calculator* that NCI provides in its Airflow Testing and Diagnostics class, technicians or comfort advisors can quickly price the job using customized inputs for material, labor costs, and desired profit margins.

The AirMaxx™ report, the scope of work, and the pricing provide all that's needed for what may be the most professional and informed bid the customer has ever seen for HVAC work.

3. Execute and Verify: Your installation and renovation techs perform the work and test out the system with either the TEC or mQ apps, proving performance on the spot and ensuring

the customer they received what they paid for.


Based on the work you've performed it's very likely they'll experience immediate improvements in comfort along with reductions in their utility bills. You can bet they'll tell their friends and colleagues how it happened.

REAP THE REWARDS

To start reaping the rewards of Air Upgrades™ in your company, visit NCI's website and sign up for the next Airflow Testing and Diagnostic class coming to your area or being held live online today. You can also download the TEC and mQ apps to try out and see what you might be missing.

I believe investing in tools and training for static pressure and airflow-focused diagnostics is the key to solving many of the issues plaguing the HVAC industry today.

This new partnership with TEC and mQ brings together the best in tools, training, and software to make Air Upgrades not just a viable, but a critical step for all HVAC companies who want to succeed.

Is it better to move the highest number of boxes or to have the highest number of satisfied customers? Drop me an email or leave a comment to let me know what you think. 



Ben Lipscomb, P.E. has more than 16 years of experience in the HVAC industry, including laboratory and field research, Design/Build contracting, and utility energy efficiency program design. He is National Comfort

Institute's director of engineering and utility programs and may be contacted at ncilink.com/ContactMe.



SPONSOR Highlights

measureQuick™ App Adds to Your High-Performance Approach

When it comes to High-Performance HVAC™, **measureQuick** is among the top performance and diagnostic software apps available. Contractors benefit from its efficiency, process standardization, and improved business performance.

The app now integrates with **National Comfort Institute's** (NCI) **quick tests**. It also integrates with popular CRMs, simplifying customer management.

Join us at **NCI's High-Performance HVAC Summit 2024, September 10-13**. Discover how measureQuick works with live equipment and helps you demonstrate to customers your commitment to quality and professionalism.

Service managers can use measureQuick to monitor team performance and ensure high service quality. It's remote diagnostics and monitoring capa-

bilities provide real-time support, while *Smart Maintenance* and *Continuous Monitoring* capabilities facilitate proactive, data-driven maintenance programs.



MeasureQuick also streamlines technicians' workflows by interfacing with Bluetooth-enabled HVAC tools. It boosts productivity with guided diagnostics, comprehensive reports, and remote monitoring, reducing callbacks and increasing job satisfaction.

Explore the unique advantage of measureQuick, seamlessly compatible with leading Bluetooth-enabled tools from manufacturers like Testo, Fieldpiece, and Sauer mann. It offers a unified interface to gather crucial data and streamline your diagnostic processes.

Harness cutting-edge technology with measureQuick to elevate your team's capabilities and deliver exceptional customer service.

Visit our booth at Summit in Asheville to experience firsthand the unmatched convenience and efficiency of integrating your favorite tools in one platform.

We look forward to meeting you there.

For more information on Summit, click this gotosummit.com link. **NCI**

— by Jim Bergman, president of measureQuick

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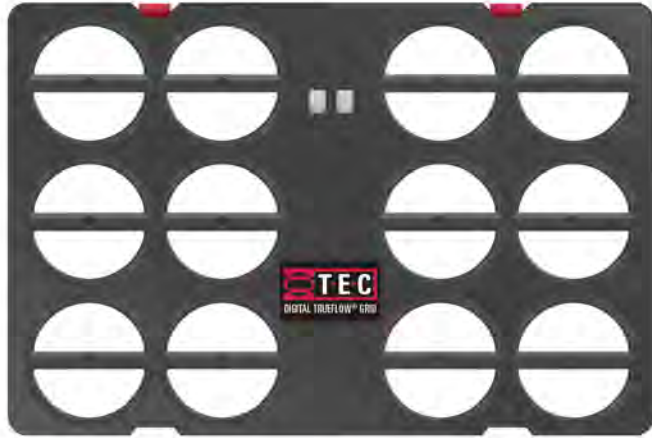
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Four Air Diagnostic Tests to Help You Pinpoint Comfort Problems

Every High-Performance HVAC™ professional has been there: You're troubleshooting an uncomfortable room and aren't sure what to do next. You've measured and diagnosed static pressure, fan airflow, refrigerant charge, and equipment temperatures.

But now what? Nothing obvious stands out. It's clear you need to move past the air moving equipment, but which direction should you go?

You have a wide variety of tests to choose from, so it's easy to get lost in the options. Unless you know what you're looking for and why, you could end up looking for answers to the wrong questions.

Let's look at four air diagnostic tests that might get you out of a jam when trying to pinpoint the cause of a comfort problem.

DUCT PRESSURE PROFILING

Filter and coil testing results are often straightforward. They will let you know if a coil or filter is dirty or restricted. However, when you discover high static pressure readings on either or both sides of the duct system, it may leave you confused.

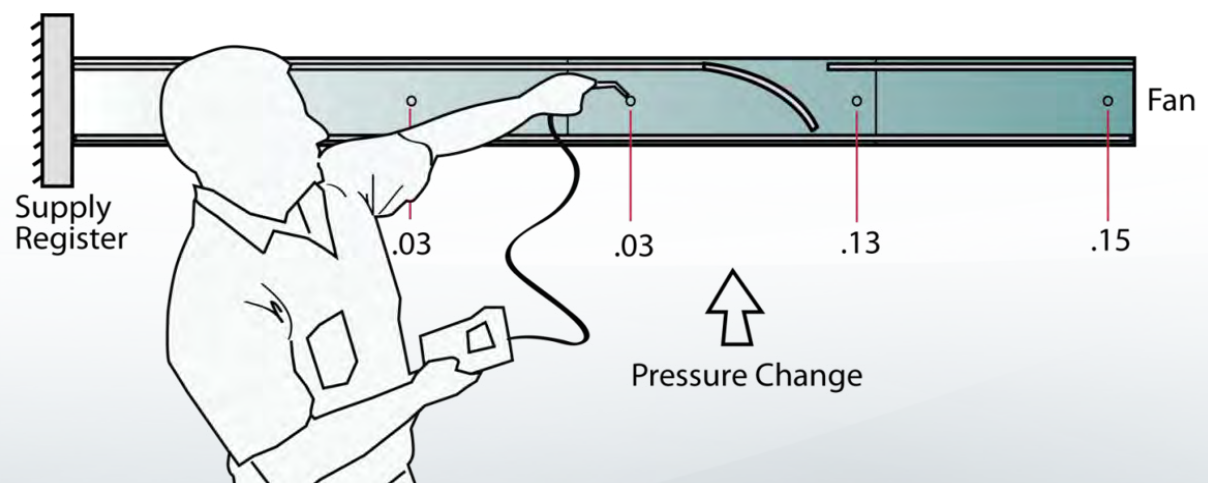
Is the entire duct system undersized or is there just a poor fitting or restriction? This is where **duct pressure profiling** comes in handy to help you locate the cause of those high pressures.

To perform this test, you'll use the same manometer and accessories you used to measure static pressure. You also need a drill or impact driver to **install test ports** in the duct system (assuming the duct is accessible).

Start on the side of the duct system with the highest pressure. It's the one most restrictive to airflow. If you're testing the supply side of the duct system, start at the supply plenum and work down the supply trunk duct, towards the end. If you're on the return side, start at the return drop or plenum, and work down the return trunk towards the return grille(s).

Install a test port every four feet downstream from your first test locations and then measure before proceeding. Look for suspect duct fittings like sharp transitions and turns. Drastic changes in duct pressure indicate excessive resistance to airflow.

Once you see a large pressure change, identify



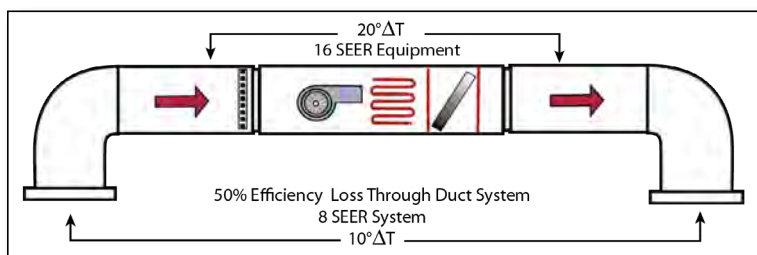
what's inside the duct and causing the problem, then repair it. This may be the only correction you need to make to fix a comfort problem.

However, sometimes you won't find any duct pressure problems, but there's still an unresolved comfort issue in a room. This brings us to our next air diagnostic test.

ROOM STATIC PRESSURE

It's possible you'll need to look closer at the room you're having issues with. One of the simplest tests is a room static pressure test. Just like you use a static pressure test for an HVAC system, you can also use one for a room.

You might wonder why? Well, the room is part of the HVAC system. It's what connects airflow from the supply registers back to the return grilles. And unless you account for this connection, you could overlook a common source of comfort problems.



To perform this test, you'll need a high-precision manometer (micromanometer) like a [DG-8 from The Energy Conservatory](#) (TEC). While a standard manometer is fine for measuring HVAC system pressures, it doesn't have a low enough range to measure room pressure.

During this test, look for how the room influences the HVAC system while it's running. A properly balanced system will have equal airflow and pressures into and out of a room.

The room pressure test helps you see if these airflow and pressure relationships are off.

Start by turning on the HVAC system to the mode of operation you're having problems with. Close the problematic room's door and attach a hose to the micromanometer. Attach a thin probe to the other end of the tubing (so it won't kink) and slide it underneath the door.

If you see a pressure change more than ± 3 pascals (Pa) there is an airflow imbalance, or the interior door is acting like a damper — cutting off return airflow to a central return grille.

Inspect the duct system and its layout to see if the problem room has a supply register and return grille. If it has both, you're dealing with an airflow imbalance. If the room only has a supply and no return, you're likely dealing with a situation where the door becomes a damper.

Comfort problems associated with this installation can be tricky because they are often situational and only appear when the door is closed. The system often works fine when the door is open.

Unfortunately, most door undercuts won't provide enough free area for adequate airflow circulation back to a central return.

So, if you're dealing with a system using a central return, you will probably need a jumper duct to relieve room pressure. To estimate the duct size needed, you can crack the room door open until you see less than three pas-



cals (3 Pa) on the micromanometer display.

TEC's [Roomulator™](#) can help you identify options to relieve the pressure in the room.

The addition of a jumper duct may be all you need to solve this problem on a central return system. But what if the problem room has both a supply and return in it and the room pressure test is inconclusive? This situation leads us to the third air diagnostic test.

DELIVERED ROOM AIRFLOW

Unless you measure airflow, you're **assuming** an important piece of HVAC system performance. Many problematic rooms suffer from low airflow. So, to eliminate it as a potential suspect, the third air diagnostic test involves measuring airflow into and out of the problem room.

You'll need a high-quality [airflow hood](#) to measure supply register and return grille airflow in the room. Some airflow hoods are designed for commercial **and** residential applications.

Make sure you choose one based on the type of work you do most and research options before investing. You can always contact NCI with questions and our recommendations.

One principle we teach in NCI's [Duct System Optimization](#) course is how to estimate room airflow. Use the following simple test to quickly troubleshoot a single room to see if it has enough airflow.

To perform the test, measure supply airflow into the problem room with the airflow hood. Then compare your measurements to the [room airflow estimate](#) and see how close you are.

If supply and return airflow are within $\pm 10\%$ of estimated airflow, then the ducts are in good shape. However, if airflow on either the supply or return is less than $\pm 10\%$, you'll want to look for duct restrictions. Common duct restrictions include kinks, excess flex duct core, too many elbows, undersized ducting, and improper support.

Getting the proper amount of airflow in and out of a problematic room

will correct many comfort issues you encounter. However, there are some tougher ones that require looking beyond airflow. This leads to our fourth air diagnostic test.

DUCT SYSTEM TEMPERATURE LOSS

Temperature is another ingredient needed for comfort. When combined with airflow, you get **Sensible Btus**, or heat that you feel. Unfortunately, duct system temperature loss prevents comfort in many rooms. Don't assume a duct system located inside the conditioned space is safe from this problem.

An easy way to check [duct system temperature loss](#) is to measure air temperatures from the supply register and return grille in the problematic room and compare them to the temperature change across the HVAC equipment.

Using four wireless temperature probes lets you see live equipment and system temperatures and reduces the time involved.

If a duct system has great insulation

and minimal leakage, the equipment and room temperature change should be very close. There will be some differences, but duct system temperature loss to a room shouldn't exceed more than a 10% of the equipment's temperature change.

Let's say you measure a heat pump operating in heating mode on a 30°F winter day. You measure temperatures at the air handler and find your supply air temperature is 88.9°F and return air temperature is 70.7°F. This equals an 18.2° temperature rise ($88.9 - 70.7 = 18.2$) across the air handler.

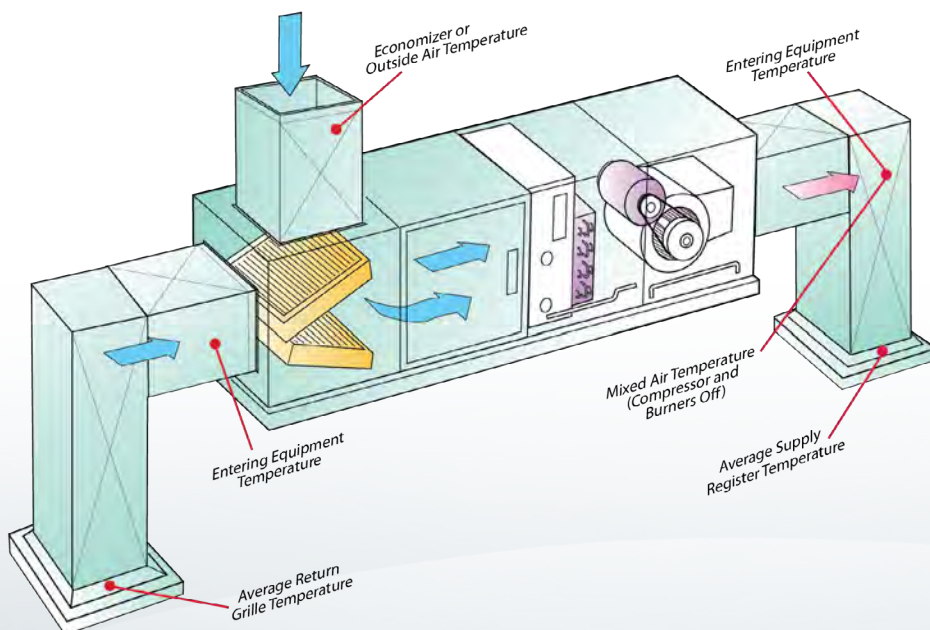
Next, you measure temperatures in the supply register and return grille in the problematic room. You find that the supply register temperature reading is 80.6°F and the return grille temperature is 71.5°F. This equals a 9.1° temperature rise ($80.6 - 71.5 = 9.1$) across the room.

To determine the percentage of duct temperature loss to the room, divide the 9.1° duct system temperature rise by the 18.2° air handler temperature rise ($9.1 \div 18.2 = .5$). After you move the decimal point two places to the right, you have a duct system temperature loss of 50%!

The most applicable repairs for duct temperature loss are adding duct insulation and duct sealing. Choose wisely from the various insulation options available. Some insulation types offer high promises but fail in extreme conditions. Repeating the temperature test can also help verify insulation effectiveness once repairs are complete.

AN AIR DIAGNOSTIC PROGRESSION

Troubleshooting comfort problems



can be tough. I hope these air diagnostic tests help you eliminate potential suspects and pinpoint overlooked causes.

While I used examples of single situations in this article, you can apply them to much more than one installation scenario or mode of operation. You'll notice the tests started with pressure, moved to airflow, and finished with temperature. These are all tests you can learn with a little practice on your own home or office systems.

We have a responsibility to make sure a comfort problem isn't the result of an HVAC issue and if it is to test, diagnose, and repair it. However, sometimes the problem is outside the scope of an HVAC system, so you need to know where to look.


This requires an air diagnostic progression and understanding of building science principles. While this isn't something many HVAC professionals will do daily, the knowledge is critical to understand how an HVAC system keeps your customers comfortable.

Your HVAC airflow diagnostics may need to shift to [building airflow diagnostics](#). The room pressure test we covered in this article is the first step towards this progression. It causes you to look at the HVAC system from another perspective. Blower door testing is another natural progression.

Depending on the situation, you may need to be paid an additional fee for these tests. After all, they are specialized. You'll have to decide how much you give away or charge based on the

situation and customer relationship.

If it's a new installation or long-time customer, you might choose to offer the testing as a goodwill offering and relationship builder.

However you choose to progress, remember to keep things simple and educate your customers in a way that's easy to understand. 



David Richardson serves the HVAC industry as Vice President of Training for [National Comfort Institute, Inc. \(NCI\)](#). NCI specializes in training focused on improving, measuring, and verifying HVAC and Building Performance. If you're an HVAC contractor or technician interested in making sure your HVAC systems grow up healthy and strong, contact David at ncilink.com/ContactMe.



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Strategic Planning for HVAC: *From Measuring TESP to OKRs & KPIs*

Strategic planning and management are a healthy part of any HVAC business. The HVAC trade has so many variables that affect a business's ability to be profitable, grow, and build a good reputation in the community; it's hard to manage that by just taking calls as you receive them and going with the flow.

Let's say a customer asks you to replace their ductwork. Do you just discuss pricing, tear out the old ductwork, replace it with new ductwork, collect payment, and call it a day? Of course not; High-Performance HVAC™ contractors don't take a "throw-things-at-a-wall-and-see-what-sticks" approach to serious comfort decisions for their customers.



COLLECTING DATA

We can't know how well an HVAC system delivers capacity if we don't take the system's vitals, like [Total External Static Pressure \(TESP\)](#) in the air handler and in the ductwork.

At [Kalos Services](#), we don't take action until we can create a plan that addresses those readings — and then we test in and test out at the end

to make sure we deliver the results we want.

But what does that have to do with business strategic planning?

It actually has a lot to do with it! It's still strategic planning, no matter how you slice it.

It's difficult to tell how well an HVAC business is doing and what its team can do better if we don't use numbers to define our goals and track our progress.

These numbers aren't just financial, either; in many cases, businesses tend to bring in more money in the summer due to the increased demand for cooling, not due to any meaningful improvements in operation. Finances alone typically don't provide key insights into your business's performance.

Numbers are important when it comes to creating and managing a business strategy. To be effective, these strategies need to have measurable goals, and we need to be able to track them with relevant numbers.

Just as we take measurements and use them to develop a plan to upgrade a customer's HVAC system, HVAC business owners gather key data about their organization to make business plans, track progress, and take action to address potential obstacles.

OBJECTIVES & KEY RESULTS (OKRS)

Kalos Services has an internal leadership program, and the very first lesson the students receive is about OKRs and how to create them. The OKR framework allows a person to make plans based on two items: objectives (goals) and key results (the metrics they use to indicate progress toward those goals).

Objectives and the SMART Framework: When we think about business objectives or goals

of any kind, we want them to be SMART:

- S** - Specific
- M** - Measurable
- A** - Achievable
- R** - Relevant
- T** - Time-Bound.

How often have you heard some say, “I want to lose some weight!”? Sure, health is relevant, and weight is measurable; we can get on a scale and see the difference between Day 1 and Day X. But do we automatically achieve that goal if we lose a little bit of water weight at the end of the day?

If we manage to get on the scale on January 1st, 2025, and see that we’ve lost one pound since January 1st, 2024, does that count as success? We may have a vague idea of what we want, but there is no way to track it, hold ourselves accountable, and know to change our strategy if something isn’t working.

Compare that to someone who says, “I want to lose 10 pounds in three months.” It’s a specific amount of weight, achievable with a generally healthy caloric deficit (along with the “please consult your doctor first” disclaimer) and has a deadline.

Once that deadline passes, that person can tell if they succeeded or if they need to change their approach, such as by setting aside time to go to the gym to put more focus on the exercise element of the diet.

Business objectives will be different from personal ones, but the same principles apply. I think “fewer callbacks” is something everyone can get behind.

However, we’ll see a greater change

in our business if we say, “I want to reduce my business’s overall callback rate from 4.5% in 2024 to 3% in 2025” than if we left it at, “I want to reduce my business’s callback rate.”

Key Results: Key results are the steps we take towards our objectives. Like objectives, key results are verifiable, specific, and time bound.

These are the progress stepping-stones that we can take towards achieving objectives.

Let’s look at the callback rate again. Some key results for that objective could include launching a training program by the end of Q1, having 100% of our technicians finish a training program by the end of Q2, with the goal of reducing service callbacks to 5%, and installation callbacks to 3%.



These are just examples, and the numbers will vary based on the ratio of service calls to installs and your team’s strengths and weaknesses.

The first two key results are actions with deadlines. The last two key results are performance milestones. Business owners and managers can measure these performance milestones by tracking [key performance indicators \(KPIs\)](#), which allow people to monitor their organizations’ operations over time and set performance benchmarks.

KEY PERFORMANCE INDICATORS (KPIs)

Speaking of KPIs, these numbers are metrics that offer vital insight into your team’s performance. They can be applied to the entire business, a specific service area or segment of the business, a marketing campaign or strategy, or even an individual employee.

[In the construction world, project managers often rely on KPIs](#) to monitor project progress to determine whether they will finish on time, need to adjust labor or material organization, stay within the budget, etc.

Keep in mind that all KPIs are metrics, but not all metrics are KPIs. Metrics refer to any type of number that can offer information, while KPIs are specific metrics that can be tracked over



time to provide big-picture insights.

For example, the number of times a single marketing email is opened is a metric. It tells us important data about that email campaign. But it doesn't point to a big-picture aspect of the business's overall performance.

Your callback rate and how many service or installation calls are done per day or week are more meaningful KPIs to an HVAC organization.

They're still pieces of information, but they can be tracked over time and give you clues about how your organization is operating, where it's improving, and what still needs improvement.

Some common KPIs for HVAC businesses include:

- First-time fix rate (or its inverse: callback rate)
- Calls per day (and sometimes per technician per day)
- Jobs booked per CSR
- Sales revenue
- Revenue per lead.

These aren't all the KPIs, but they can tell you quite a bit about the health of your organization and your team's performance.

USING KPIS EFFECTIVELY

KPIs aren't goals, but they can inform on goals. You can use KPI milestones as key results for OKRs, and they can help you decide whether you need to change your strategy to better meet goals.

For example, if the goal is to reduce your callback rate to 3%, and you find it dips from 4.5% to 4% in Q1 but stalls around 4% or increases throughout the rest of the year, that's your cue to examine the factors that lead to callbacks a bit more closely.

Some factors to consider for closer

examination are service or installation procedures. Do you have a clear standard operating procedure (SOP) in place? Is it documented and accessible? Do technicians know how to perform all the tasks in those SOPs? Do a lot of the callbacks deal with a certain part? Do you need to train technicians to install that part or consider using a different brand (if possible)?

The KPIs let you know to identify points where technicians need additional resources, like commissioning checklists or training.

You can go even narrower and examine each technician's individual **callback rate**. Use timesheets and service logs to track these for your entire organization and for each technician.

If some technicians consistently have callback rates above that 4 to 5% range, that says you need to look at their employee development.

Assess their knowledge and skill level to see where they might need additional training — or, if possible, assign them a mentor.

On the flip side, if you notice technicians or installers with callback rates below 3%, you'd be wise to see what they're doing right. Have these people developed personal processes that work for them? Could you document and promote their personal strategies to spur positive changes throughout the organization?

Tracking KPIs provides info about your company and evidence to show that recent efforts are working, not working, or having no major impact.

HAVING A STRUCTURE

Ultimately, **strategic planning for an HVAC business** is all about having a structure that allows you to



make goals and continuously track progress.

The OKR framework is great for that since it sets forth a broader objective and a few means of measuring that progress. Those key results are the measurements; they need to be verifiable and time-bound to offer a clear picture of where the organization is at and create a sense of urgency.

KPIs may also be those gauges of progress; they're continuous metrics that tell where an organization is healthy and where it needs improvement, and can serve as benchmarks. Like a health chart, you can look back on earlier KPI benchmarks to see how the organization has grown, regressed, or shown little change.

Tracking company performance is a lot like commissioning a system or devising an upgrade plan; you can set and track goals while identifying weaknesses or problems to address.

Business objectives help you to set deadlines, update to higher goals, and/or sustain positive results. Strategic planning is an ongoing process: measure, plan, repeat. **NCI**



Emily Gutowski is the technical writer and content editor for **HVAC School** (founded by Bryan Orr), in Clermont, FL. She has occupied this role since 2020, the same year she graduated from the University of Florida with her Bachelor of Arts in English, and a minor in mass communication. Emily can be reached at ncilink.com/ContactMe.

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WELCOME NEW MEMBERS

NCI Welcomes New Members

The National Comfort Institute (NCI) team is pleased to welcome the latest contracting firms to join the membership of this contracting organization. They joined the largest exclusive network of High-Performance HVAC professionals nationwide.

New members should visit national-comfortinstitute.com to learn about their membership benefits, training opportunities, and more.

By the way, while on the site, be sure to register for access to all of NCI's knowledge base.

Please help us welcome the following newest members:

- **Air Analyst HVAC**, Cypress, TX
- **Berry Best Services**, Dallas, TX
- **Day & Night Air Conditioning, Heating & Plumbing**, Phoenix, AZ
- **Dryer Vent Guys**, Fredericksburg VA
- **Ed Bishop, LLC.**, Troy, NY
- **Frontline Air Conditioning & Heating LLC**, Roanoke, TX
- **Maikai TAB Services Ltd**, Calgary, Alberta, Canada
- **Mechollage, Inc.**, Virginia Beach, VA
- **Pyne Valley Air**, Queen Creek, AZ
- **V.Y. Services Co.**, Elizabethtown, PA.

We are excited these companies decided to join our family and look

forward to hearing from them.

The team at NCI encourages new and existing members to look for member benefit updates through email. This includes announcements, our email newsletter, and more on our website (hvactoday.com), and on our social media sites.

If anyone has questions about their membership, please call the NCI Customer Care line at **800-633-7058**.

Welcome Two New Summit Speakers

The team at National Comfort Institute (NCI) is pleased to announce the following additions to our list of presenters and session leaders at the **2024 High-Performance HVAC Summit**, which is nearly upon us.

This year's Summit is being held in Asheville, NC from September 10-13. Our



new additions are as follows:

Chuck Worley of Worley Home Services in Yorktown, VA. He will be leading the session titled, "**Customer Communication: Drop the Technospeak**," and will share his experiences explaining the high value of a system performance approach to

homeowners.

Codi Novini is the former owner of SoCal Airflow Pros, a residential/light commercial High-Performance HVAC™ company located in Rancho Santa Margarita, CA.



Cody will be leading a newly-added session on **Integrating High-Performance into Your HVAC Business**.


In this session he will describe the challenges and opportunities he faced as he implemented high performance into his company. This includes marketplace roadblocks as well as team resistance to the changes he was making.

If you haven't done so, be sure to [register for Summit](#) today and secure your room at the [Crowne Plaza Asheville Hotel](#). Be sure to ask for the NCI special room rate.

We look forward to seeing you there!

Airflow Test/Diagnostic Class Update


This fall, NCI's [Airflow Testing and Diagnostics](#) classes will incorporate some updated technology into the program. Class attendees will use the Trueflow® Grid live and see how it fits in the Air Upgrade process. Attendees will also receive training on how to use NCI workflows in the **The Energy Conservatory** and **measureQuick®** mobile apps.



To learn more, call NCI's Customer Care Team at **800-633-7058** and ask about the class schedule, and how to register. 




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Tom Johnson: A Life Well Lived



Dominick Guarino is publisher of *High-Performance HVAC Today* magazine and President & CEO of National Comfort Institute, Inc. He can be reached at ncilink.com/ContactMe.

On June 23rd, 2024 we lost a very special person, forward-thinking HVAC contractor, industry influencer, great father and husband, and a pillar of his Christian community. The legacy Tom Johnson leaves behind in every aspect of his life will undoubtedly endure for generations to come.

I knew Tom as a friend, lifetime learner, ethical contractor, carbon monoxide evangelist, and intensely serious yet affable NCI instructor. I also knew him as the all-around fun-loving guy I met along with his ever-cheerful wife, Corrie many years ago at HVAC Comfortech.

But it wasn't until Tom's celebration service shortly after his passing that I learned about the other incredible facets of Tom's life. For starters, those who knew Tom in his early years recounted stories of a daredevil athlete who never stood down from a challenge.

In his youth and adult life he played basketball and football, was an avid snow skier, water skier, boater, jet skier, fisherman, hunter, cyclist and motorcyclist. He also pretty much jumped head-first into any adventure that presented itself!

Tom truly lived his faith. During his memorial service, some of his closest friends described how involved he was in his community and his church. Besides being a leader of his church's men's group for many years, he was known for cooking and serving breakfast for their youth group in his garage every Thursday morning. He embodied his faith in too many ways to describe in this short tribute.

As a contractor, along with his brother Mark, Tom built an incredible reputation for **TM Johnson Bros** in the town of Cambridge, MN over the past three decades. The company is known in

their community as the go-to expert, especially when it comes to keeping their homes safe from carbon monoxide.

In an article he wrote in December of 2017, Tom shared his journey to "*Becoming a Local Carbon Monoxide Evangelist*." He was adamant that every one of his technicians and plumbers needed to be "NCI trained and certified before going into the field – no matter where he had to send them."

Training was at the very core of what propelled his third generation company into a top contracting business. Everyone at TM Johnson Bros undergoes about 200 hours of internal and external training each year.



In Tom's words back in 2014, "Training keeps the techs engaged in the company. We believe making the investment in training shows them the company cares about our customers, so they do too."

Tom was very active with his local associations, and he wrote numerous articles over the years. Some included in past issues of this magazine are: [Family Business Success Through Communication](#), [Becoming a Local Carbon Monoxide Evangelist](#), and [CO Safety is Job One](#).

Tom's company was an **NCI 2014 Contractor of The Year**. He won several other NCI awards including our 2016 Chairman's Award, 2017 Training Excellence Award, and 2018 David Deiben Technical Excellence Award. He was also featured as a [Top Industry Influencer](#) in 2020.

Tom, we know you are watching us from heaven, likely hanging out with Rob Falke and sharing stories of glory days. I have a feeling you've been assigned a special job to watch over those in danger of CO poisoning. Godspeed my friend. You will be sorely missed, but not forgotten. **NCI**

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Combustion Performance & Carbon Monoxide Safety Training Program

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September 17-19: Lansing, MI
September 17-19: Roswell, GA
September 24-26: Johnstown, CO
September 24-26: Waterbury, CT
October 1-3: Austin, TX
October 1-3: Eagan, MN
October 22-24: Mentor, OH
October 22-24: Grand Rapids, MI

Commercial Air Balancing Certification Program

September 17-19: Denver, CO

Airflow Testing and Diagnostics

August 20: Utica, NY
September 17: Somerville, MA
September 24: Tampa, FL
October 1: Dayton, OH
October 15: Johnstown, CO
October 29: Kissimmee, FL

Duct System Optimization Certification Program

August 21-22: Utica, NY
September 18-19: Somerville, MA
September 25-26: Tampa, FL
October 2-3: Dayton, OH
October 16-17: Johnstown, CO
October 30-31: Kissimmee, FL

Duct System Optimization & Residential Air Balancing Certification Program

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October 15-17: Foxborough, MA

Refrigerant-Side Performance Certification Program

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September 17-19: Anaheim, CA

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September 24-25: Anaheim, CA

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Airflow Testing and Diagnostics
October 29: Stockton, CA

Refrigerant-Side Performance Certification Program
October 30-31: Stockton, CA

****TECH CLEAN CALIFORNIA ONLINE LIVE TRAINING ncilink.com/TECHCleanCA**

Airflow Testing and Diagnostics - ONLINE LIVE
September 3-4

Refrigerant-Side Performance Training Program - ONLINE LIVE
September 10-11: Part 1
September 17-18: Part 2

Residential System Performance Training Program - ONLINE LIVE
October 1-2: Part 1
October 8-9: Part 2



NCI SUMMIT 2024
GoToSummit.com/Schedule
for more information

Advanced Airflow Diagnostics with Hands-on Recertification Class
September 10: Asheville, NC

Advanced CO and Combustion Diagnostics - Recertification Class
September 10: Asheville, NC



* NCI training sponsored/subsidized by Southern California Edison (SCE) for qualified local contractors.

** NCI training sponsored by TECH Clean California for qualified local contractors.

Visit [NCIlink.com/ClassSchedule](https://ncilink.com/ClassSchedule) to view the latest schedule.



Hurry!

TIME IS RUNNING OUT TO REGISTER FOR NCI'S SUMMIT 2024

OUTPERFORM!

**The NCI Summit 2024 is September 10th - 13th
at the Crowne Plaza in Asheville, NC**

Change in the HVAC industry is happening at a faster pace than ever. Electrification, heat pumps, inverter technology, new refrigerants and new efficiency standards are just a few of the challenges and opportunities in front of us. The key is to be prepared, proactive, and educate your team to meet the new opportunities head-on.

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