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

JIM DAVIS:

The Living Legend of Captain CO

ALSO IN THIS ISSUE:

- Contractor Spotlight on Home Heating, Bend, OR
- How Important is IAQ in High-Performance HVAC?
- Should HVAC Service Be Based on Law or on Truth?

**October is National
IAQ
Awareness
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IAQ

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Jim Davis: The Living Legend of Captain CO

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It's National Indoor Air Quality Awareness Month!



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

Frankly, every day should be Indoor Air Quality (IAQ) Day, right? After all, as Americans, we spend more than 90% of our time indoors (according to the U.S. EPA), and shouldn't that air be clean and healthy? The obvious answer is yes, but there is little guidance on what good IAQ means or how to accomplish it.

There are agreed-upon norms throughout the HVAC industry for acceptable or even "good" IAQ. For instance, the American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE), Standard 62.1 and 62.2 are both recognized ventilation standards.

But what does that mean to your customers? It means nothing unless you make it a point to talk about IAQ with them and offer services to help identify sources of potential IAQ issues.

CASE IN POINT ...

Several years before the outbreak of the COVID-19 pandemic, I began working from home in my basement office. It was a nice slice of heaven. That heaven changed when I noticed a white powdery substance on my office and bathroom doors and on the surface of some of my office furniture. I had no idea what it was and, at first, ignored it as dust.

But it got worse – forming on some of the basement walls and along the sills of the basement windows. So I called my HVAC contractor, who came out, looked at it, and said it was some kind of mold.

He recommended a mold remediation contractor who found that moisture was leaking into the basement through broken seals around my glass block windows. The remediator sealed off and misted my basement for three days to kill the existing mold, re-sealed the windows, and then

conducted a thorough clean up. Several thousands of dollars and three weeks later, my mold problem was resolved.

The remediator suggested I install an extra dehumidifier to pull excess moisture out of the air and add fans to increase air circulation to prevent any mold from forming again.

That sounded like band-aid fixes, so I called my HVAC contractor, who said they were not doing IAQ services. For that and other reasons, I changed contractors. The new company was focused on training its technicians with National Comfort Institute and offered IAQ monitoring services as part of my maintenance agreement.


PEACE OF MIND

Two times per year, my HVAC contractor comes to my home to check on my HVAC system, run an air quality monitor, and provides me a report that shows exactly the quality of my air. Talk about peace of mind.

Thanks to that report and the fact that the mold has never re-appeared made working in my home office safer, more comfortable, and frankly, happier – to this day.

The point is that because my new contractor was well-trained, understood the importance of airflow, and, maybe more importantly, how to explain everything to my wife and me in terms we could easily understand, we bought the expensive maintenance agreement without installing an extra dehumidifier and fans.

So the question is, are you offering IAQ services to your customers, and do you explain to them what that means? If not, the time to start is now, in October, during IAQ Awareness Month.

And check out our IAQ roundtable story on page 11 to see what some other High-Performance HVAC contractors are doing. 

Written by HVAC Professionals for HVAC Professionals

Supco ATP1 Attic Pro Utility Lift

Removing risk is everyone's job. Poor risk management can lead to workers' comp claims, property damage, equipment damage, and unnecessary extra labor hours for the HVAC company.

Let's face it: doing attic installations can be high risk. They aren't the easiest, usually requiring three technicians: one in the attic and two on the ground. The two on the ground must lift the equipment over their heads while the tech in the attic pulls.

Supco International has eliminated the need for three guys, saving installers' backs, and reducing potential property damage, and can help you save time with their **ATP1 Attic Pro Utility Lift**.

The Attic Pro was invented by a real HVAC technician who was also a fireman. As a one-man operation, he was looking for a way to help lift furnaces and air handlers up into attics. His invention, the ATP1 lift, will span 14- to 24-in. trusses using built-in clamps that lock the lift in place once tightened.

It can lift up to 250 lbs. using a manual winch with a built-in lock feature, which will take care of almost any air handler or furnace. The cable length is 20 feet, which in most cases is overkill, but you won't have to leave it in the truck for certain jobs. You can put it to good use.

Made of durable steel, the ATP1 has a beautiful orange powder coat, a protective carrying case, and harnesses to use on the equipment you need to lift.



You use the winch hook and provided straps to crank away. This tool will save time and money and help risk management reduce workers' compensation claims each year.

If you're wondering where to get the ATP1, check out **True Tech Tools**.

— Casey Contreras, NCI Instructor **NCI**

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On the Journey to High-Performance Professionalism

In Central Oregon, sitting on the eastern edge of the Cascade Mountain Range along the Deschutes River is the city of Bend. This high-desert area was one of the few crossing points for pioneers in the early 1800s as they journeyed along the famous Oregon Trail. It is an area also traversed by the Lewis and Clark Expedition and eventually was settled, becoming a critical logging community.

It is also one of only three continental U.S. cities with an extinct volcano within its city limits. Today, it is known for its outdoor recreational activities, and its primary industry is tourism.

SETTING THE STAGE



Ric and Cecilia Secor

Bend, OR, is also the place that [Home Heating and Cooling](#) calls home. Owner Ric Secor and his wife, Cecilia, started

this High-Performance HVAC contracting company in November 2010.

"My journey in the HVAC Industry began working for my Dad. He had a commercial HVAC company in San Diego during the Vietnam War, and I worked for him for 10 years after high school.

"Dad always said that *air conditioning is just not air conditioning or air.*

It's all the other stuff that you can do with air. It's the humidifier humidifying air. It's about bringing in fresh air.

"I always took his words to heart. That's why I've always liked the idea behind a total comfort system. Total comfort comes from doing all the right things with air."

When Ric decided to hang out his own shingle, he took all his retirement savings and started Home Heating.

"From the very beginning I wanted to be a highly rated company by consumers," Secor explains. "I wanted to be known locally for doing good work. "So that's how we started our journey. We focused on add-on replacement work," Secor adds.

HOME HEATING TODAY

Home Heating has 11 employees today, plus Secor and his wife. The team includes one full-time salesperson (one of his sons), and Ric is a part-time salesperson. They also have three service experts, two lead installers, and two assistant installers.

Home Heating also has two technicians who focus on indoor air quality. They use the company's Aero-seal equipment to seal ductwork and handle the company's in-house duct cleaning business (which includes dryer vent cleaning and dryer vent performance upgrade work).

In 2022, the company achieved a little more than \$2.8 million in gross sales, and Secor says they are current-

ly on track to do between \$3 and \$3.3 million.

"Despite supply chain challenges, we had a strong finish last year. We're also counting on finishing strong in 2023," Secor says.

TOOLS OF THE TRADE

Secor explains that when managing the company, he wants to automate and digitize as much as possible. Today, Home Heating fields 14 service and installation vehicles, which he tracks using a system called [Verizon Connect Reveal](#).

He says, "This GPS lets us know where all our vehicles are at any time. That helps control fuel costs, cover scheduled services when something goes wrong, and keep customers informed when their service expert will arrive.

"Plus, we own an [Aero-seal](#) machine and do a lot of duct sealing. We've been doing this for nearly 10 years."

In April of 2023, Secor attended his first NCI **High-Performance HVAC Summit**, where he discovered the power and advantages of [TrueFlow® Grids and DG-8 manometers](#). "We bought six of them, and our team is already using them in the field," he says.

Another tool Secor says is a vital part of their operation is [CompanyCam](#), a tool for posting images and documents to the cloud and works like a database. It is highly searchable, and



Secor says it is a great tool to help educate customers about their systems and Home Heating's solutions.

"CompanyCam allows us to educate customers about what we do so they can decide if we provide more value and are worth the extra money. It allows us to take and share job photos. We can share information between teams and with customers. We can document and use those images to prove what we did to solve customer problems."

SAVING THEIR BACON

In one case, CompanyCam even saved Home Heating from problems when a consumer was looking for someone to blame for their problems. Secor tells the story of this particular consumer who called them requesting maintenance work on their attic system.

Later, that consumer had a fire and blamed Home Heating because they said it was caused by some heat tape that Secor's service expert used on their drain line.

"I opened up the customer's CompanyCam file on my cell phone, saw which tech was on that call, and also saw he took a picture when he was leaving," he explains.

"We hadn't been there since. So, I asked the customer on the line if I could send them a picture showing no

heat tape on the drain line.

"There was a long pause, and then the customer said it must have been another company and hung up. That one instance of using CompanyCam proved its worth and saved our bacon."

THE JOURNEY MUST INCLUDE TRAINING

When it comes to the tools and instruments his team uses to perform their work professionally, Ric Secor says success requires training.

"I think training is important. It really helped me. At one company where I worked for more than 20 years, the owner provided me with training opportunities that changed my life. He did this during a time when most HVAC companies in the late 1980s and 1990s didn't focus on training."



Secor explains that as a result of his experiences, his philosophy is to provide as much training as his team wants.

"We aren't a huge shop but have a training room with operational equipment," he explains.

Secor regularly uses outside training firms as well. He recently sent one of

his newest team members to the **Ultimate Technical Academy** in Arkansas to earn an EPA certification.

Other educational outlets include reading HVAC trade magazines. He says he discovered National Comfort Institute (NCI) in some of those magazines. Then, he met NCI trainer David Holt in 2018 at a program in Washington.

"That is where I really came to understand how NCI membership could benefit my company."

Subsequently Secor joined NCI to help advance his team's technical prowess. He says he is excited to get his guys going with combustion and carbon monoxide (CO) safety training and refocusing on airside testing and measurement.

"We are at the highest NCI membership level. We're saving up our NCI bucks to use for training. I hope to have one or two of our service experts attend the CO training this fall. After that, I plan to send some of our guys to airflow training scheduled in the Pacific Northwest and Denver over the next couple of months."

BRINGING HIGH-PERFORMANCE HVAC INTO THE FOLD

After attending his first NCI High-Performance HVAC Summit in Branson, MO, in 2023, Ric says he was utterly amazed at the systematic



The Home Heating team includes 11 employees. Service, installation, and duct cleaning techs are excited about their new Trueflow Grids, which they already use in the field.

and method-based approach to total system performance. As stated earlier, he bought six TrueFlow Grids and already has his service experts using them in the field.

“The fact is ductwork has always been important to me,” Secor explains. “It’s very easy to look at testing and measuring when we are out on a duct cleaning call. Our duct cleaning business is also a great way to start a relationship with a potential HVAC customer.

“What is cool is how excited my duct cleaning crew is about measuring static pressures and airflow,” he adds.

“They finally can see the “why” behind it after cross-training over the last few weeks, and they can see that these measurements are not hard to do.”

Starting a performance approach with duct cleaners is a different, but Secor sees it as the perfect way to get all his technicians on board. Though at the early stages of implementing a high-performance culture, Secor already sees the advantages it brings his company and his customers.

“I know it will reduce the chance of callbacks, of getting blindsided in the field,” Secor says. “Even from from a

sales point of view, I see the high-performance approach as being essential. Once we become more proficient at it, we can show actual data to prove to customers that what we do and recommend is based on testing, measuring, and diagnosing their comfort issues.

“It won’t be easy. We are on this long journey, and it’s sometimes frustrating to see how long it takes to make it work within our company. Still, as the team becomes better trained and more practiced, the hope is that struggle will decrease as success increases.”

BUT WAIT, DUCT CLEANING?

Duct cleaning has been part of Home Heating’s service offerings since its second year in business.

In those early days, Secor subbed out his duct cleaning services to what he calls “one of those carpet-air duct cleaning companies.”

But that all changed during an installation project where he was up in a customer’s

attic while his duct cleaning subcontractor was working in the primary bedroom.

“I was coming back towards the attic access and had a funny feeling that I should go down and not let the duct cleaning company owner know I was watching him.

“He was doing a reverse air sweep back towards the vents with this custom tool he invented. And suddenly, this poof of dust came into the customer’s bedroom. The owner of the duct cleaning company looked at me, and I looked at him, and we didn’t say anything to each other. Luckily, I had covered the customer’s bed in plastic before work began. That was the last time that duct cleaning company worked for us.”

Several months later, Secor found and bought his own duct cleaning truck and began doing that work in-house. He never subbed it out again.

PROFESSIONALISM IS SO IMPORTANT

“My goal for Home Heating is for our trained High-performance HVAC crew to look at customers’ homes



Field technicians at Home Heating and Cooling wear their logos with pride and showcase their professionalism every day.

holistically. It goes way beyond just changing out equipment. When there's leaky ductwork or ductwork that needs modification either at the equipment, up in the attic, or underneath the house, we must find it and fix it. When finished, we will have a product we can stand behind," he explains.

"What helps us right now is testing-in and testing-out and understanding the details behind system performance. It is just not turning on a system and walking away. It requires understanding equipment sizing, air distribution, measuring, testing, and why you must do them.


"In the end, we need to nail down our airflow skills. We have to hone our people skills. We have to work hard to figure out what's in the customer's

**"From my perspective, being professional and looking professional is priceless to the public."
– Ric Secor**

best interest. You can't forget or ignore the duct system. You have to understand the impact of duct leakage on airflow and comfort.

"As I said before, all of this is a journey. Not just a journey to best-in-class craftsmanship, but also to what I call professionalism. We are working hard to become top professionals, and that is an ongoing process. But it is our goal," says Secor.

"From my perspective, being professional and looking professional is priceless to the public. It shows pride, and that's good. Pride in craftsmanship adds real value to people's lives," he concludes.

For these and many more reasons, the team at **High-Performance HVAC Today** selected **Home Heating and Cooling**, Bend, OR, as this month's *Contractor Spotlight*. Congratulations to Ric Secor and all his team. 



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How Important is IAQ in High-Performance HVAC Contracting?

Addressing Indoor Air Quality (IAQ) issues has become more crucial over the past four years than ever before. The COVID-19 pandemic made that abundantly clear by forcing people to work from home and really pay attention to their home comfort systems.

In fact, today, more than 90% of Americans spend their time indoors, according to U.S. Environmental Protection Agency (EPA).



Mitch Bailey

The EPA says that the number one concern for IAQ is combustion by-products such as carbon monoxide (CO), particulate matter, and tobacco smoke.

HVAC contractors play a crucial role in addressing IAQ issues for their customers. Poor indoor air quality can have significant health implications, so HVAC contractors need to approach the problem systematically and effectively.

With October being National IAQ Month, we thought it prudent to ask several High-Performance HVAC contractors from around the country and Canada to talk about how important IAQ is in their business and whether they address it with product-based solutions or based on finding root causes.

We spoke to the following contractors:

- **Mitch Bailey** of [Bailey's Heating and Air](#), Modesto, CA
- **Will Horner** of [Canco ClimateCare](#), Newmarket, Ontario, Canada
- **Dawn Mroczek** of [GV's Heating](#), Glenview, IL

■ **John Boylan** of [Lakeside Service](#), Brighton, MI

■ **Cody Novini**, [SoCal Airflow Pros](#), Lake Forest, CA.

Each contractor takes a slightly different approach to dealing with customer IAQ issues. Still, all agree that airflow is the key to preventing problems upfront or solving issues at the back.

THE ROLE OF AIRFLOW

Mitch Bailey says, "It is crucial with high-performance systems to have adequate airflow and proper air distribution throughout the building. Improper air mixing can develop into comfort issues and IAQ problems. This means that the [design and installation of the system](#) needs to consider airflow, from proper sizing to fit the space, equipment selection, ductwork sizing, register placement, and register selection."

He adds that contractors should [always consider IAQ needs](#) when designing a system. He says no HVAC system should be designed and installed without considering humidity, temperature, client allergies, indoor odors, VOCs (Volatile Organic Compounds), the building envelope, and customers' wishes and goals.

"You should also consider ease of servicing and the potential for monitoring customers' indoor air."

Will Horner agrees. He says Canco ClimateCare looks at IAQ issues on an individual basis.

"We take the time to ask questions about what the home or business occupants need. The questions



Will Horner

generally pertain to personal wellness issues like headaches, allergies, respiratory conditions like asthma, etc.

“We look at the home or business as a system,” he adds. “As High-Performance HVAC contractors, we consider the building part of the duct system. Our techs test **CO** and **static pressure** on every call, and if warranted, they’ll sell a deeper investigation to find root causes of problems they discover.”

At Canco, Will says they don’t usually charge for initial testing and can often find the cause of the customer’s problems and offer a solution. Other times, they need to do more work.

At GV’s Heating, **Dawn Mroczek**



Dawn Mroczek

says they focus on ensuring the HVAC system operates optimally. She says they investigate high and low static pressure situations, blower speeds, temperatures, and humidity issues.

“All of these things can relate to IAQ problems within a home. If we are not measuring, collecting, and evaluating the data, how can we come up with a solution? How can all system components operate efficiently if the airflow is incorrect?”

“At SoCal Airflow Pros,” says **Cody Novini**, “the name says it all. **Airflow** is the core of our business. Our biggest push is toward proper airflow and static pressure in any system we encounter. We are not product-focused, though certain products can help us prescribe solutions for customer IAQ

and other problems.

“Typically, we don’t tell the client they must replace all their equipment and add this high-filtration system. That is just so overwhelming to them. So, we look at their airflow first,” Novini explains. “We ask about uncomfortable rooms, then conduct an airflow evaluation through testing and diagnostics.”

PRODUCT SOLUTIONS AND ROOT CAUSES

John Boylan says that at his company, Lakeside Service, they also do system performance testing and diagnostics focused on airflow and will address IAQ issues they encounter. He says humidity is a big issue in the Michigan marketplace.

“By looking at **building performance**, we look for duct leakage, air infiltration, and approach solutions from a testing and diagnostic standpoint,” Boylan says. “Regarding IAQ, Lakeside provides customers with product solutions based on those test results and diagnostics.

“Let’s face it,” he adds. “You can sell a dehumidification system, but if you don’t stop the source of high humidity, you’ll wind up with a mediocre result.

It’s like taking an aspirin because you have headaches, but the cause is that you’re not drinking enough water. The aspirin will reduce the headache, but it will keep coming back.”

However, today, John is thinking



John Boylan

about reassessing their IAQ approach. “It’s recently become apparent that our customers don’t know about all our services.”

He says he feels they can do a better job finding root IAQ causes, which requires recommitting to training and working IAQ into their service and new installation routines.

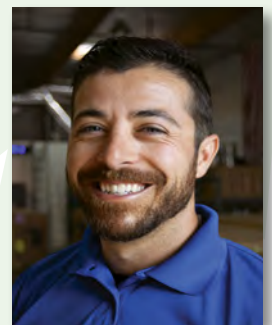
SYSTEMATIC APPROACH TO IAQ

All the contractors we spoke with say they systematically approach their work in customer homes and buildings. They all do static pressure testing and check the system fans, filters, ductwork, and mechanical equipment.

Mitch Bailey adds that his company also looks at the building envelope by inspecting attics and crawlspaces and conducting room pressure testing. **Cody Novini** says they also check registers and look for tell-tale signs that something is amiss – dust build-up on furniture, using too many portable fans, etc.

To do this work, these contractors all use specific tools and instruments. For example, At GV’s Heating, **Dawn Mroczek** says they use particle scanners to see the air quality in customer homes.

They use infrared cameras, Fieldpiece psychrometers, sensors, and combustion analyzers to help them find IAQ root causes. They also measure humidity levels. She says they are



Cody Novini

currently looking into purchasing an air monitoring system.

On the other hand, **Cody Novini** doesn't test for humidity or conduct air monitoring. He says, "In our locale, humidity issues are very rare. Lake Forest, which is southeast of Irvine, is never too humid or dry. Every seven years or so, we may get a request to install a humidifier during winter because the indoor air is too dry, but we normally don't sell humidifiers."

Will Horner says they use humidity-sensing instruments and particulate counters to find and solve IAQ issues.

Interestingly, none of the contractors here currently use IAQ monitoring tools. **John Boylan** and **Mitch Bailey** say they used to but stopped for different reasons. In **John Boylan's** case, he says it was expensive and feels Lakeside didn't capitalize on its benefits.

"Ten years ago, we were doing a lot of air monitoring testing but weren't turning it into solutions for people. I don't think we invested enough into air quality training to make it worth it. Long story short, nobody was driving it, and air monitoring never took off for us.

"However, I am looking into the idea of making monitoring part of our service agreement package," he says.

"We also are considering air monitoring services as a next step," adds **Dawn Mroczek**.

IS DUCT CLEANING IMPORTANT?

For Canco ClimateCare, **Will Horner** says they do not offer duct cleaning services but recommend having that work done if necessary. In fact, the only contractor in our group who does duct cleaning is **Dawn**



Mroczek of GV's. She says, "We absolutely offer this service and take before and after photos to show customers what we did."

The two California contractors say that much of the duct used in their state is flex duct, which is not suitable for duct cleaning services. **John Boylan** used to sell duct cleaning and is considering getting back into it with a dedicated crew.

TRAINING CONTINUES TO BE VITAL

"My feeling is that our industry should take a hard look at how to train our people to find IAQ source problems, then prescribe solutions that may or may not involve selling new products," says **John Boylan**.

"High-Performance HVAC Contractors are well-positioned to do IAQ work properly and ethically, so we can find problem sources and resolve them to our customer's satisfaction."
– John Boylan

"We need to educate ourselves better to do the right thing for the client," Boylan adds. "The key, again, in my opinion, is airflow. High-Performance

HVAC contractors work on airflow and deal with the air in the building space. We are well positioned to do IAQ work properly and ethically, so we can find problem sources and resolve them to our customer's satisfaction."

"We have biweekly training on all kinds of subjects, and IAQ is involved in most of it," says **Mitch Bailey**.

"Our training happens each week," adds **Will Horner**.

"Every training session has some aspect of static pressure included. We use **NCI's static pressure budgets** as the standard baseline and can evaluate and sell filtration, system cleanings, and maintenance," says Horner.

Cody Novini says that his company holds service training two or three days per week, and "our installers get spring and fall refreshers on the importance of proper airflow and ductwork.

"They all go through the program offered through National Comfort Institute (NCI), including **residential air balancing** and **duct system optimization**. We use airflow to tie all the different types of training together."

Dawn Mroczek says they use the Daikin/Amana IAQ class to keep their techs up to speed on the latest techniques and products. That training is held annually.

KEY TRENDS TO WATCH

"There is a danger today for contractors to seek easy answers to IAQ

issues,” says **Cody Novini**. “It seems like more consumer product manufacturers than ever are building and selling IAQ products through online and brick-and-mortar stores. Anyone can buy these products and plug them in with promises that they will solve air quality problems.

“I see these as band-aid solutions at best, and many can be more dangerous than helpful. Properly fixing IAQ requires finding the root sources of the problem. As HVAC professionals, that is our job, our mission.”

Mitch Bailey says, “As homes are being built tighter, IAQ becomes critical. Every HVAC system must be able to provide clean, fresh air along with comfort.”

“It can’t only be about selling prod-

uct-based IAQ solutions,” concludes **Dawn Mroczek**. “We have local competitors who sell consumers everything from UV lights to whole house filtration systems and more, without testing and measuring system performance. This can create more problems for consumers who continue paying for poor system performance, uncomfortable rooms, and products that may not help.”

Will Horner concurs. “We are in the life support business,” he says. “IAQ is a keen part of that. The only way to prove real solutions is by ensuring each consumer’s HVAC system performs as designed to provide the most comfortable, energy-efficient, healthy, and safe indoor environment possible. That can only be done by

providing the proper airflow balanced with the cleanest air.”

For these contractors and the hundreds of others trained and practicing **High-Performance HVAC contracting**, indoor air quality is essential every day, not just during October’s IAQ month. **NCI**



Mike Weil is the editor-in-chief of **High-Performance HVAC Today** magazine as well as the director of communications for National Comfort Institute. He has covered the HVAC Industry in the trade press for 37 years. He is focused on a contractor-first approach to editorial, specifically targeted to the High-Performance HVAC Contracting community. Weil can be reached at ncilink.com/Contactme.

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UPCOMING NCI TRAINING SCHEDULE

PUBLIC LIVE TRAINING

Combustion Performance and Carbon Monoxide Safety Certification Program

October 3-5: Plymouth, MN
October 3-5: Fenton, MO
October 17-19: Emmetsburg, IA
October 17-19: Mentor, OH **SOLD OUT**
October 24-26: Hillside, IL
October 31-November 2: Grand Rapids, MI
November 7-9: Union City, GA
November 7-9: Morristown, TN
November 28-30: Allentown, PA

Residential HVAC System Performance and Air Balancing Certification Bundle

October 3-5: Glen Burnie, MD

Commercial Air Balancing Certification Program

October 3-5: Las Vegas, NV

Duct System Optimization and Air Balancing Certification Program

October 10-12: Spokane, WA
October 17-19: Denver, CO
November 14-16: Austin, TX

PUBLIC LIVE TRAINING (cont.)

Airflow Testing and Diagnostics

October 17: Morristown, TN
October 17: Tampa, FL
October 17: Austin, TX
October 18: Morristown, TN
October 18: Tampa, FL
October 18: Austin, TX
October 24: Union City, GA
October 25: Union City, GA
October 26: Doraville, GA

Refrigerant-Side Performance Certification Program

October 31-November 1: Austin, TX

Performance-Based Selling Bootcamp

November 7-9: Fenton, MO

Commercial System Performance Certification Program

November 7-9: Monroeville, PA
November 28-29: Livonia, MI

High-Performance HVAC Design and Redesign

November 28-30: Austin, TX

*SCE SPONSORED LIVE TRAINING ncilink.com/SCE

Duct System Optimization and Air Balancing Certification Program

October 10-12: Anaheim, CA

Combustion Performance and Carbon Monoxide Safety Certification Program

October 17-19: Anaheim, CA **SOLD OUT**

Commercial Air Balancing Certification Program

October 24-26: Anaheim, CA

Advanced Air & Hydronic Balancing Training Program

November 13-17: Anaheim, CA

Airflow Testing and Diagnostics Implementation Workshop

November 29-30: Anaheim, CA

**TECH CLEAN CALIFORNIA TRAINING ncilink.com/TECHCleanCA

Residential HVAC System Performance & Electrification

October 10-12: Fresno, CA
October 24-26: Sacramento, CA

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Visit **NCIlink.com/ClassSchedule** to view the latest schedule.

Jim Davis: The Living Legend of Captain CO

For decades, one person has searched for the truth about combustion and its impact on safety, health, and efficiency. His natural curiosity and analytical mind founded the modern age of combustion testing, analysis, and carbon monoxide (CO) safety. His name is Jim Davis, and, in my opinion, it's time we recognize him for all his contributions to the HVAC Industry.



Jim "Captain CO" Davis

Initially, Jim started working for an HVAC distributor in Cincinnati, OH. In 1978, he was a counter guy who sold a new test instrument to his commercial and industrial customers. It was a combustion analyzer, which cost about as much as a car.

His early days in the industry were humble ones. As a counter guy, Jim found that the customers he sold analyzers to had no idea how to use them. So started the journey of Captain CO.

Jim Davis didn't come into this industry with an engineering degree. However, he brought his strongest skill set – his curiosity. This trait became the foundation of legends. So much so that, back in 2015, National Comfort Institute President Rob Falke wrote an article for *Contracting Business* magazine called "[The Curious Captain CO](#)."

CHALLENGING TIMES

For Jim to succeed, he had to teach his customers how to use the analyzers. So, he looked for resources where he could learn about their use but

found that there wasn't much available in the way of instructions.

Not one to give up, Jim Davis started to teach himself how to use analyzers. He sought out and began reading books, some of which were hundreds of years old! Jim also started digging into the concepts behind combustion engineering. He started researching. And his reoccurring question was always to ask 'Why.'

In fact, Jim asked 'why' and 'what if' questions about everything. He then followed up those questions with testing and more why questions.

For example, when he discovered [rising carbon monoxide](#), it was purely by accident. Instead of doing what everybody told him, he broke traditional testing practices and left the analyzer probe in the flue.

Back then, CO measurement wasn't digital. Instead, it was an analog tube-style indicator with a *length of stain* that changed when CO went up. In this case, the indicator went from showing no CO to filling up the whole tube. Jim wanted to know why that happened. So, he changed out the tube, and the length of stain instantly filled the tube again.

Jim called the test instrument manufacturer to find out why this happened. Unfortunately, they didn't know. Fortunately for the entire HVAC industry, Jim wanted an answer. He started deep diving into his research until he discovered what was happening: the combustion process was deteriorating inside the equipment, leading to excessive CO production.

More than 40 years later, most of our industry still fails to recognize this phenomenon and continues to stress single-point CO measurements after 10 minutes of equipment operation.

In my opinion, this is one of Jim Davis's most



significant contributions to the HVAC industry.

He accidentally found something because he was curious and broke the rules. He then took it upon himself to teach his customers how to work the instruments.

EDUCATION LEADS TO OPPORTUNITY

From then on, the Captain used every opportunity to educate HVAC technicians and company owners. He'd even go out and help them in the field. One of his primary roles was assisting the contractors he served.

And when he did that, he took every opportunity to learn more. That included finding the right ways to measure combustion, among other things. The cool thing is that Jim admits he didn't have all the answers. He often didn't even know what questions to ask.

Jim viewed every new job as a unique opportunity and adventure. If he waited for all the answers, he would never have advanced our understanding of combustion and CO measurement. He was willing to expose his ignorance to learn and share with others.

Was this easy? No. It became harder because many in our industry were unwilling to challenge the accepted norms. Some of those who questioned

his findings included equipment manufacturers, utility providers, code agencies, and other industry professionals.

For 100 years, the combustion air compliance rules haven't worked. Jim has proven this time and time again. Despite these codes defying fundamental physics, code authorities still tell people they must follow these rules to be compliant. Anyone properly trained can prove through measurement that these rules haven't worked for years.

Traditions are hard to break, so things continue to go as they always have. Jim challenged the status quo by questioning traditions for a better, smarter way that could be proven through measurement. And when he found answers, others in the industry often didn't believe them.

"Despite so many challenges, for more than 45 years, Jim Davis has influenced national standards. Whether people in this industry will admit it or not, he has influenced how they look at equipment and its installed environment.

STANDING OUT TO DRAW ATTENTION

Besides having such a curious mind, Jim Davis is a character, too. In addition to the trademarked haircut, he seeks ways to grab people's attention.

Many students have experienced combustion analyzers flying across a training room, books tossed discus style, or jokes told in his classes. Some people think he is a trainwreck. Others are drawn to his antics so they can watch the trainwreck. He does things to create controversy so people will pay attention. He likes to create that environment.

A lot of that was in response to how he was treated. The industry considered him controversial. So, he became controversial. He had to fight for every square inch to advance the measurement method. His students came up with a nickname for him over the years that stuck: Captain CO. They saw him as a crusader. Some of his more artistic students began sending drawings of Jim Davis in a cape or holding twin tablets, like Moses on Mount Sinai, with the Captain's "Commandments of Combustion" on them.

He influenced people so, so much. Many people in the industry, including me, found our purpose through his teaching. He showed us that there is much more than just installing ducts or fixing equipment. Now, we are saving lives. We find things that others overlook, and the result is that HVAC technicians help people stay safe and healthy in their homes. If CO



problems arise, Jim's students can determine what is happening and correct it based on what he taught them.

One of his students, Eric Kjelshus of Eric Kjelshus Energy Heating and Cooling, Greenwood, MO, tells how he had sooting problems in the 1990s that he couldn't resolve.

"I met Jim at an HVAC Comfortech event in Cleveland, OH. We talked about sooting issues, and he asked me how I tested to discover what was happening. I was using a flue gas meter and a cartridge-type CO meter that only estimated where the CO level was.

"Jim showed me the benefits of using better technology, and I was one of his first customers to buy a battery-type flue gas meter. It was fast and reliable and helped me determine why the sooting was happening and solve the problem. He gave me knowledge that I still use to this day."

THE NCI CONNECTION

One story of how Jim saved lives involves the CEO of National Comfort Institute (NCI). Dominick Guarino and his family had just moved to Cincinnati, OH. Dominick had recently left his position as chief editor of Contracting Business magazine and joined Excellence Alliance, headquartered in Cincinnati.

Dominick and his family moved into the home they bought in Northern Kentucky, and shortly after moving in, his wife and kids passed out. He almost did as well. Dominick had enough wits about him to shut everything down and open windows.

Dominick knew about Jim Davis from his former role with the magazine. So, he called Jim on a Sunday morning. Jim arrived at Dom's house

within 30 minutes, tested Dominick's boiler, and discovered and fixed what was wrong.

He potentially saved Dominick's whole family. That's when Dominick realized that everything he'd heard about Jim Davis's approach to combustion testing might be true. Instead of thinking Jim was a nut, Dominick became the biggest proponent of combustion testing and CO safety because it affected him personally.

After Dominick and Rob Falke started NCI, Jim joined them part-time, eventually becoming a full-time senior instructor.

FIRST IMPRESSIONS

I worked as a technician for my family's HVAC business in those days and first met Jim by attending his first NCI CO class in May 2001 in Louisville, KY.

My first impression of him was that he was crazy. I'd read his articles since 1995 and tried to get him to schedule classes through our local distributors. The distributors kept telling me I shouldn't have anything to do with that guy.

But after reading his articles, I thought he was really onto something. And then, once I finally got into the class, he talked about things I'd never seen in print. I felt I understood some of these things, but I thought he was nuts on some other stuff.

Then, when I went home, I tried to do the tests Jim taught. He challenged us during class. He said, 'Don't take my word for this stuff. Go out and start testing. Try to prove me wrong or prove me right.'


I was all fired up to prove him wrong. I didn't realize I had joined

many other people wanting to do the same thing. And, like them, I couldn't.

The first time I tested equipment and found the rising CO that Jim talked about, I finally believed in him. I began to implement combustion testing in our company's routines slowly. Anytime I ran into trouble, Jim was always there to help me. He would answer my questions, steer me in the right direction, and help me better explain what I was doing. At the end of the conversation, there was usually a joke. Sometimes, it was hilarious, other times not.

Jim can prove everything he teaches through precise measurements regarding the combustion side. He does not share opinions. Instead, he shares indisputable facts based on physics and measurement.

He focuses on what is essential and always explains our responsibility as HVAC professionals. Over the decades, Jim has empowered at least four generations of technicians to do the right thing. As a result, he either directly or indirectly helped save untold lives. In the process, he took all the bullets and arrows. Most people would have just quit. Jim didn't because he knew it was the right thing to do.

That is the living legend of Captain CO. I'm thankful for the day I met him because, without his influence, I probably wouldn't be at NCI. 

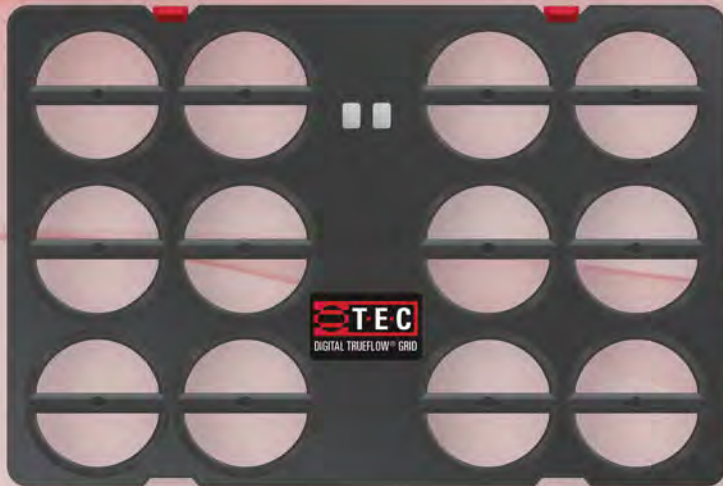


David Richardson serves the HVAC industry as Vice President of Training for National Comfort Institute, Inc. (NCI). NCI specializes in training focused on improving, measuring, and verifying HVAC and

Building Performance. If you're interested in learning more about Jim Davis or want to swap stories, contact David at ncilink.com/ContactMe or call 800-633-7058.



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Should HVAC Service Be Based On Law or Truth?

The NCI training team recently wrapped up our yearly Trainer's Week event. It is a week jam-packed with learning, camaraderie, and more food than anyone can handle. Every New Year's, people worldwide decide to create their resolutions and go on a diet. Well, not us. We must make a Trainer's Week resolution because of the extra 50 pounds we put on.

The group of guys I work with are amazing. I have never met so many who have a professional purpose to help the contractors and technicians in this industry. Many trainers teach for glory and self-worth, but not these guys.

There was a distinct theme this year, and it was all about what we can do for the people we serve.

THE BATTLE

There is an ongoing battle between right and wrong, law and truth, and survival and prosperity. The trainers were asked to think about this question. Are we teachers of the law or teachers of the truth? In this scenario, the law includes the **codes and standards** created by the industry to meet government requirements.

After kicking it around for a minute, we realized we were teachers of the truth. Sure, there are laws within what we teach. We consider these laws true because they have been proven through testing and verification. When there is a law that cannot be tested and consistently proven, we do not teach it.



Do you follow laws in your business, or do you strive to provide truth? Most contractors fixate on the rules of our industry. They believe that if they install HVAC equipment by following the codes and standards, they provide customers with the best systems. Unfortunately, code-compliant systems usually only deliver 63% of that equipment's capability.

I understand why contractors fear not following the law — they worry about getting into trouble or failing inspections. These problems can happen when inspectors don't understand why you did what you did. The only way to prevent an issue with customers and the powers that be is to test, install, and service based on truth.

HERE'S A STORY

In my early days, I was a technician who prided myself on following codes and standards. I'd sell a job based on code. I'd bad-mouth the installing contractor for their lack of compliance when I found something not installed to code. I'd tell customers, "The unit doesn't work correctly because somebody didn't follow the code."

After a few years of working in the field, experiencing many comfort complaints, and seeing parts fail, I realized that following the law didn't work. I lost faith in it. It wasn't until I learned that HVAC products and equipment are simply components of an entire system that I learned what I call the truth.

Part of this truth is that I needed to examine other areas of the system before touching the refrigerant circuit. It was a hard truth to understand that only making an equipment repair often did not fix the system. The truth goes beyond checking temperature changes (ΔT) or adjusting gas pressure to 3.5-in. w.c.



HERE'S THE TRUTH

We have all been indoctrinated to do our jobs according to what others have done for generations. They are traditions. The scariest part is that most technicians don't test their repairs or modifications to verify what they did works.

If you think I'm full of it, I can prove it with these questions.

1. Is [hooking up your gauges](#) the first thing you do when you service an air conditioning unit?
2. Do you adjust gas pressure to a certain inches of water closet (in.-w.c.) when tuning a furnace.

If you answered yes to either question, you have been brainwashed to think this is the correct process.

Test-ins are the most crucial test you can do on any system. Test-ins allow you to see all the invisible issues that occur. The discovery of the hidden issues starts with **Total External Static Pressure (TESP)**.

Indoor fans can only operate correctly under maximum rated TESP — when TESP is too high, equipment airflow is reduced. High TESP often results in airflow of around 285 CFM (cubic feet per minute). That's far less than it should be — 350 CFM to 450 cfm. Typically, this is what you need for a unit to operate correctly. Of course, that's dependent on climate.

Here's a thought: As HVAC technicians, you are not refrigerant pressure checkers; you are **heat transfer detectives**. Everything that you

do revolves around transferring heat. The equipment removes or adds heat to the air.

Airflow across the indoor and outdoor coil must be correct in cooling mode. Proper airflow allows the right amount of indoor air heat to be removed and the proper amount of heat rejection through the outdoor unit. This is the principle of taking heat from one place and transferring it to another.

Lack of Airflow contributes to many of the issues you run into on every call. Among the issues are low superheat, high head pressure, intermittent pressure switch faults, refrigerant overcharge, erratic TXV (thermal expansion valve) behavior, failed compressor, failed blower motors, high limit switch trips, etc.

Low airflow results in excessive heat in heating mode, which wears out heat exchangers and other components. Ponder this for a second: you tune up a furnace to 3.5-in. w.c. on the gas valve, and your ΔT is 71°F.

The equipment's nameplate data specifies 3.5-in. w.c. with a 45° to 75° temperature rise. So all is good, right?

Wrong! You have shortened the life of that unit. If you took some extra time and used a combustion analyzer with the proper measurements, you would have discovered the airflow was only at 76% of what was required.

SEEK TO UNDERSTAND


One of my favorite sayings from

Stephen Covey is [SEEK TO UNDERSTAND](#).

I always get a kick out of children who always ask **WHY**. When they are told not to do something, they will ask, "Why?" If I say I'm fixing something, they ask, "Why?" At every turn and every situation, they always ask that question.

As adults, we've lost that. It goes back to the saying, don't ask, just do. In the High-Performance HVAC world, technicians should change that to ask why, to test, and then discover and confirm the truth of how well an HVAC system is operating.

The laws in the books today are only useful truths if you can test and find them valid consistently. As technicians, I believe it is our job always to seek to understand by asking why at every turn. Doing this will help you recognize what is true or false and right or wrong. That is the key to your success and customers' comfort and safety.

By the way, this stuff isn't always easy, so when you are stuck or unsure about a situation, I invite you to contact me at any time. 



Casey Contreras is an instructor for [National Comfort Institute](#) since 2015. He has many years of residential, light commercial installation, and service experience. He became NCI certified in residential and light commercial air balancing, HVAC system performance, duct system optimization, and CO and combustion. He can be reached at ncilink.com/ContactMe.



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Learn more and Register Today at ncilink.com/CO or call 800-633-7058

Summit 2024 Hotel Registration Is Now Open

Ladies and Gentlemen — **The High-Performance HVAC Summit 2024** hotel reservation site went live on September 25. In case you haven't heard, the upcoming Summit event will be held at the [Crowne Plaza Asheville](#) in Asheville, NC, from **September 10-13, 2024**.

There are four ways you can reserve a room:

1. Attendees can take advantage of specially negotiated room rates of \$174 per night by going to www.ashevillecp.com. Enter the dates of your stay, then use the NCI Room Block code of **NCI** to get the low rate.
2. You can also use the following link, which will automatically add the NCI block code for you: [NCI Summit 2024](#). **This link is NOT Mobile Compatible!**
3. If you'd like to reserve rooms the old-fashioned way, call the Asheville Crowne Plaza toll-free number **844-330-0296** (open 24/7) and mention the group name of **NCI Summit 2024** to receive the special group rate.
4. Finally, for In-House reservations, attendees can call the local number during regular business hours — **828-285-2603** — and mention the group name, **NCI Summit 2024**.

DON'T FORGET TO REGISTER FOR SUMMIT!

No worries if you haven't already locked in your spot at Summit itself. You can still do so here: gotosummit.com/summit-registration. Early registrants get several bonuses, including access to the **FULL 2023 SUMMIT RECORDINGS**. But you must register for 2024 by



December 31, 2023, to have this access.

If you have questions, call your Customer Care Representative at **800-633-7058**.

Welcome to Our New Members

The National Comfort Institute (NCI) team is pleased to welcome the latest contracting firms to join our High-Performance HVAC Contracting membership. You all just joined the largest exclusive network of High-Performance HVAC professionals nationwide.



What does this mean? NCI offers an unparalleled approach to contracting that virtually guarantees you'll make more money while providing best-in-class service to your customers. New members should visit nationalcomfortinstitute.com to learn about membership benefits, training opportunities, and more.

By the way, while on the site, be sure to register so you have access to all of NCI's special member benefits.

Without further ado, welcome to our newest members:

- Southeast Clean Air Solutions LLC, Henrico, VA
- Cardinal Heating & Air Conditioning Inc., Sun Prairie, WI
- JC Mechanical Heating & Air Conditioning, Denver, CO
- Detmer & Sons, Inc., Fairborn, OH.

We are pleased you all opted to join our family and look forward to hearing from you. Please look for regular member benefit updates here, on our social media feeds, and in our email announcements.

If anyone has questions about their membership, or would like to join today, call our Customer Care line at **800-633-7058**.

NCI's David Richardson Promoted

NCI is pleased to announce that David Richardson was recently promoted to *Vice President of Training*, effective immediately. According to NCI Chairman and




CEO Dominick Guarino, David has done an incredible job rising to the challenge of "filling some very large shoes over the past year and a half since the passing of [Rob Falke](#)."


"I think David is the right person for the job. His passion for our mission and core values is immeasurable. He has worked tirelessly since last May balancing managing the training team along with curriculum development."

Richardson will continue to lead the NCI instructors in his new capacity while building a solid curriculum team.

Read more about David Richardson's promotion at ncilink.com/DR.

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IAQ and HVAC System Performance *Are Joined at the Hip*



Dominick Guarino
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HVAC Today* magazine
and President & CEO
of National Comfort
Institute, Inc. He can
be reached at [ncilink.
com/contactme](mailto:ncilink.com/contactme).

While many IAQ (Indoor Air Quality) problems are caused by building issues, the HVAC system can also have a direct or indirect impact on poor air quality.

Some indoor pollutants including Volatile Organic Compounds (VOCs), Radon, biological growth (i.e. mold), and dust can be caused by the home or building. Sources of these pollutants include poor construction practices, foundation and/or slab moisture, poor insulation, even lack of maintenance.

With some good building science training, as an HVAC contractor you can help identify the causes of these problems. But unless you are ready to take on remodeling and other building-side corrective actions, it's usually a good idea to refer that work to another professional.

WHEN IS THE HVAC SYSTEM TO BLAME?

Many IAQ issues are a direct result of an improperly designed, installed, or maintained HVAC system. Certainly, you can recommend some of the traditional remedies like better filtration, dehumidification, even UV lights and other products. However, unless the product truly targets the source of the issue, it will be just a band-aid, and the actual causes will continue to exist.

So when is the HVAC system a direct or indirect culprit? Let's start with some of the more obvious direct issues. These include return duct leakage bringing in dirt, dust, and other pollutants from unconditioned areas like attics and crawl spaces.

Moisture buildup in and around the air handling equipment, especially in coil drain pans, can cause IAQ issues. Indoor coil blow-off from high air velocities also introduces moisture into the duct coil-condenser matches. Improper system matches can reduce dehumidification as well.

Improper system sizing can directly contribute

to IAQ issues, especially in higher humidity areas. An oversized cooling system will short cycle, dropping the indoor temperature but never running enough to remove the moisture. The symptoms are typically a cave-like, cold, clammy interior space, where mold and mildew easily grow – check shoes in a closet for mildew!

INDIRECT CAUSES


Some of the indirect HVAC causes for IAQ issues include poorly designed or imbalanced air distribution systems. The results include drawing dust, dirt, insulation, and moisture from unconditioned spaces through can lights and other building envelope openings.

Poor air distribution systems with high static pressures and low airflow can condition some areas while others are hot or cold. As a result, parts of a home or building can be comfortable and healthy while others remain uncomfortable and unhealthy due to stagnant air, high CO₂ levels, and other related issues.

Finally, a major issue caused by pressure imbalances is carbon monoxide. Negative pressures near combustion appliances including furnaces, water heaters, boilers, even stoves, can cause back drafting or spillage.

This leads to re-burning of combustion gases producing carbon monoxide levels that can range from unhealthy to dangerous.

The bottom line is when you're in a home or commercial building with IAQ issues, it's important to know how to test the performance of the HVAC system in addition to looking for visual clues for sources of indoor pollution.

When you take the time to thoroughly test, you also help protect yourself from liability. Plus you can make more accurate recommendations to fix the building or the HVAC system – or both. 



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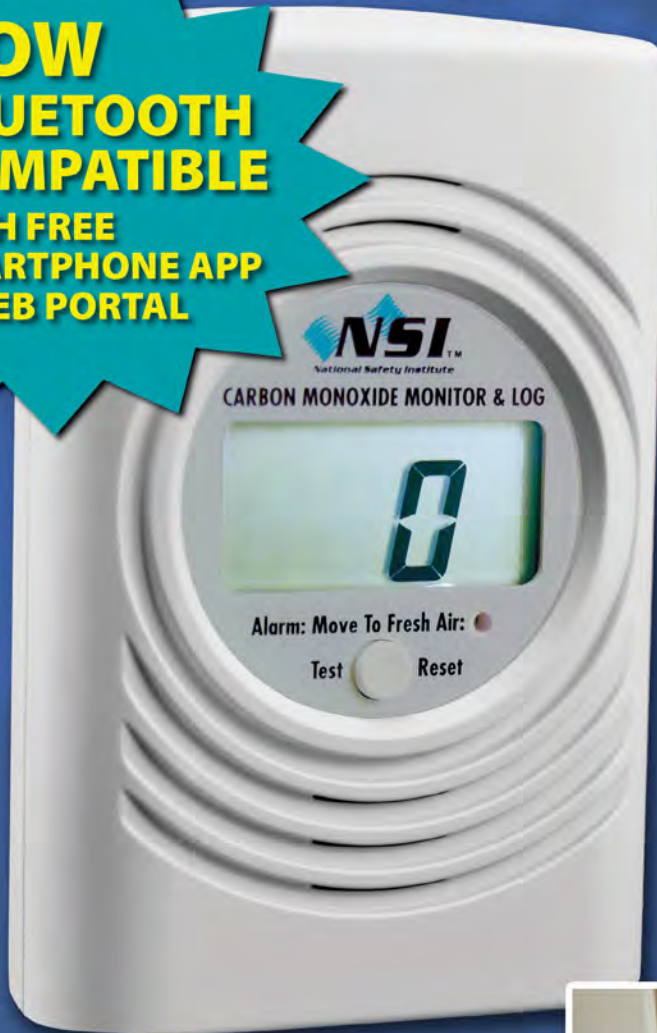
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