



Mike Mayberry

keeping the hvac/r past alive

ai & AUTOMATION vs. HUMAN

the four pillars of IAQ

tech talk: A2L

oem spotlight:

grinding out the
mexico project





Congratulations!!

Welcome to the fall 2024 episode of HVAC Tactical Magazine.

A voice of the people.

When we rolled out the very first issue of the magazine, we had a vision to bring the voice of the trenches and the movement to the mainstream.

A magazine for the trenches, by the trenches.

Our goal is simple.

- Provide valuable, relevant content that our fellow tradesmen and tradeswomen in the trenches can appreciate.
- Build awareness of the movement happening on social media and highlight individuals making an impact in the HVACR community.

Content

If you or someone you know has great content that you'd like to see published in the magazine, feel free to reach out. We're always open to chat!

Email us at magazine@hvactactical.com

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Be sure to follow us on social media and get plugged into the community!

Thank you for your support and welcome to the movement!

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marketing director / Refrigeration Technologies

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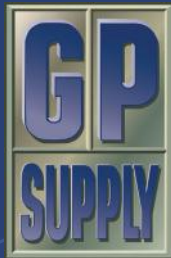


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Ben Poole HVAC Tactical Founder

Ben Poole is an entrepreneur and 3rd Generation HVAC professional. He founded HVAC Tactical in 2018, the HVAC Tactical Awards in 2020 and the HVAC Tactical Magazine in 2023.

His goal is to simply elevate the industry, reignite the passion for the trade and motivate others to take on the personal responsibility of mastering their craft.



Giana Brucella Editor-In-Chief

Giana Brucella is a passionate writer and editor, and has been in the marketing field for the last seven years.

Her keen eye for detail and organization skills help keep the HVAC Tactical magazine looking sharp, clean, and without typos.



Matthew Pryce Managing Editor

Matthew Pryce is a published author, professional musician, innovative digital marketing maven, and rabbit & traditional husband.

His work has appeared in the Sports Illustrated, The National Review, the NY Daily News, various HVAC publications, and of course, the **HVAC Tactical** magazine.

He sits on the HARDI marketing council, and handles marketing/communications for Centrotherm Eco Systems, a plastics manufacturer located in New York.



10 QUESTIONS

with BECCA STAMEY

Director of Marketing
Refrigeration Technologies

what do you love about HVAC Tactical?

What don't I love about it?! But honestly, seeing what HVAC Tactical has done to promote and share the stories of people who make this industry great is admirable. Plus the brand is just badass.

what's a surprising thing about working in HVAC?

How complex and intricate the trade is. I didn't realize how many different types of skills were needed. In the beginning I thought of it as just 'heating and cooling' but there's a lot of problem solving and precision involved, and since techs seem to be working on their own, they have to trust their own expertise to get it done. I really respect that.

what is a completely unsurprising thing about working in HVAC?

How dedicated techs are to their work! The pride that the hvac community takes in sharing knowledge, hyping each other up, and showing off their installs/service work is unlike any other community.

Also, the humor – there is never a shortage of memes, I may not always understand the context but they definitely make me laugh.

you seem to travel a lot for work, what's that like?

Definitely a mix of fun and exhaustion. It can be tough balancing travel with personal time - but it makes me appreciate coming back home even more. It's taught me to how to go with the flow, the most unexpected things can happen while traveling and usually it's out of your control.

Traveling also makes for some strange interactions, like most recently, a lady hissed at me in the tsa line in Dallas.

any amazing spots that have become a favorite work destination?

Work travel doesn't necessarily take me to the most glamorous destinations but I get to see and experience places that I wouldn't pick to go myself, like Jacksonville, which was surprisingly pretty, and I never expected Winnipeg Canada to have really good food.

I'll never pass up a trip to Boston or Las Vegas, and racking up airline miles so I can travel to places I want is a great trade off.

ok, so any tattoo regrets?

No regrets! I look at my tattoos as part of my life journey and different chapters. Some of my first ones aren't the best quality but they meant something to me at the time and are a reminder of good times, how far I've come or a memory I want to hold onto for life.





what about big plans for more ink?

I pretty much always have a tattoo scheduled, it's my therapy (ha!) and having amazing artists that book out months in advance makes me have to plan a bit. My next piece will be done in February after all the AHR craziness, and then the plan is to finally finish my right arm sleeve, I only have the most painful places left (elbow, elbow ditch and inner bicep), so I've been avoiding it.

alright, you're driving to the grocery store or something - what's on the radio in the car?

Depends on my mood, but it's almost always some form of electronic music- house, dubstep, drum & bass. I also enjoy podcasts but I usually save those for the mornings while getting ready, and I catch up on industry podcasts when I'm working.



big career plans in HVAC or something else long term?

Right now, I'm really happy with where I am, working at Refrigeration Technologies and focusing on making the Viper brand better and better. I love creating new content and finding fresh, exciting ways to showcase Viper products and the people who use them. I do want to get more involved with organizations pushing the industry forward - it's a great way to give back and stay inspired. I've got a little side project in the works that I think people are going to vibe with, but it's not quite ready to launch just yet.

give us advice for women entering the industry!

Don't be afraid to ask questions and keep learning, whatever role you're in, building up your skills is key. Find the people who have your back and want to help you grow, and remember that being your best also means trusting yourself and standing up for yourself. Say 'yes' to new opportunities, even if they feel a bit outside your comfort zone.

AGENTS



Ask A Jerk #3

Hey, welcome back to "Ask A Jerk"!

I can't believe it's getting chilly out there already. The leaves are down, the turkey is almost ready, and there's someone in my house giving my credit card a friction burn buying stuff for Christmas! Have a great holiday season and be sure to remember those that aren't as fortunate as we are. Peace!



Dear Jerks,
I'm a service tech that works on a lot of high efficiency gas furnaces and water heaters, mostly Rheem and Lennox. Last week I went to a home that had no hot water on a tankless unit, and it turned out that there was water in the gas valve. How does that happen?

-Float My Gas

Dear Floaty,
Interestingly enough, I came across two situations just like that this year, and although you didn't describe where the unit was located, I'll bet it similar to the couple I saw.

In both cases the units were high efficiency models mounted on a basement wall. They each had long intake pipes (more than 40 feet) that passed through an air conditioned area and pulled combustion air from outside the home. After a lot of frustrating investigation, I realized that this only happened during hot weeks in the summer.

That is, when the units weren't running, warm damp air would migrate into the intake pipe that ran through the cold basement. The air would cool down and condense in the pipe, with the water running back into the unit. Since the combustion air pipe wasn't directly connected to the combustion chamber, the condensate would drip on to the top of the fan, into the open-air intake below, then run back into the gas valve.

I only figured this out by seeing the rust spot on top of the fan of a one-year-old unit. After I thought about it, I realized that I had seen this problem before, but didn't understand why. You can learn something new every day.



What up, you big Jerks!!!

I just started by own service company after working for the man for eight years. I was making about \$30 per hour, and I know I'm going to have more expenses now, so I started charging \$65 per hour on my service calls plus material. Everyone that I talk to though says that I have to mark up my material, but I don't understand why if I'm charging so much per hour. I feel like I'd be ripping off my customers; what should I do?

-Big Ticket Tech

Yo, Big Ticket!

Alright, this is an important one, and a topic that comes up quite a bit. This is all about overhead, knowing what your actual expenses are, and how you calculate them. One of the biggest mistakes that new business owners make is not understanding their true costs, and therefore not charging enough to cover them.

There are so many expenses that we as non-owners take for granted when working for someone else but must be recovered from your customers if you are to survive as an owner.

Sure, we all think about the cost of the truck(s) and maybe the answering service, or tool replacement, but do you understand that you want to pay yourself for eight hours per day, but can only bill for 5 or 6 hours a day? (Go back and look at your records) Then there is the time you spend returning parts under warranty, and fixing the truck, and building your website and answering emails and doing estimates, etc, etc. Even just going to pick up material for the job you're doing today is time that you probably didn't bill for, and this is just the TIP of the iceberg.

There are many different ways to recover these expenses, whether all in the hourly rate, by marking up your material, or a host of others, just be sure to collect for it somewhere. (When is the last time you added on for drop cloths or pipe dope?)

Your accountant can help you with all this, and also show you how to add his fee in there, too!

Hey, HVAC Jerks,

My spouse is always complaining that I work too much and that I don't spend enough time with her anymore. I do work a lot of overtime, and she doesn't make as much, but we have a lot of expenses. How do I get her to understand that we need the money?

-OT King

Dear OTK,

I think all service people go through this at some point in their careers, I know I did. Luckily, if you are even a somewhat decent technician, you're probably making a pretty good living these days, especially if you're willing to work overtime. But like with everything in life, we have to learn to make compromises. My father used to always say "everything in moderation".



I hated hearing that, but he was right. The bottom line is this; we get all caught up in buying cars and a house, going out to dinner and raising the kids, that we very often don't even realize how fast it's all passing us by. Before you know it, you've been doing this for twenty years or more, your kids are almost moved out, and your wife has been flirting with that weird dude at the grocery store that always dresses like an elf and walks around quoting Gandhi!

Take a step back, light one up, and realize that if you're not careful, you could lose it all. In fact, you're lucky that you haven't lost it already. Understand what's important in your life and slow down a little. Give up the overtime once in a while and spend that time with the ones you love, like you used to.

Being the king won't mean squat if you don't have anyone to share it with.



mike mayberry.
**keeping the
hvac/r
past alive.**



By Dan Vastyan







As the Internet of Things and Artificial Intelligence promise (or threaten, depending on your perspective) to change the skilled trades, Mike Mayberry (@hvac_refer_guy) is encouraging tradesmen and women to remember their roots.

“The trade is moving so fast that we’re forgetting its past,” said Mike. “Sensors and Bluetooth technology may speed up the troubleshooting process, but we’re getting too reliant on that technology. I’m worried that we’ll reach a point when we don’t know how to find the underlying cause of an issue. That said, I’m an old head, and maybe I deserve to go away.”

Mike began his career in the trades in the 1980s. The men he learned from started their careers in the 50s.

One of his mentors fought in Vietnam.

“Some elements of the trade haven’t changed,” said Mike. “For example, we still brake and roll sheet metal the same way we always have. The process is better and faster, but it’s the same.”

“I don’t dislike technology,” he continued. “It’s a new tool and should be used as such. The important thing is that we don’t become so reliant on technology that we don’t understand the basic principles of refrigeration. Knowing the ‘how and why’ makes us better technicians.”

After 38 years in the trade, Mike is currently a safety trainer for a nationwide HVAC company. He also uses his social media presence to educate and share quality content from other creators.

While Mike consistently worked in the refrigeration trade his whole adult life, his journey within it is more circuitous than most.

Hasn’t Done It All

Mike’s work experience covers the whole refrigeration spectrum. After one conversation with him, you’ll quickly realize that he’s been there and done that, though he’s too humble to come right out and say as much.

In 1986, not even out of AC school yet, a fresh-faced Mike began working for a raised-floor computer room company in Garden Grove, CA. He and the employer weren’t a good match, so he responded to an ad looking for a sheet metal apprentice.

“Daryl and Joel, the two brothers that owned the metal shop, were super influential on me,” said Mike. “They took a kid who didn’t know anything and taught me how to work in a sheet metal shop.”

After a while, Mike met Louie Ramirez, who owned Ramirez AC in Brea, CA. This is where Mike learned refrigeration, the hard way.

“Louie recognized how bad I was at math and doing layouts, so he taught me to do start-ups and service,” explained Mike. “Mind you, this was before cell phones. When I had a service problem, I had to find a phone booth and call the operator, who would call Louie and patch the two numbers together.”

Mike sat on many rooftops after dark with a flashlight in his mouth and a wiring diagram on his lap. No fault codes. No handheld devices. On the payphone, Louie would give him 10 things to try. If Mike exhausted those options, he’d walk back to the payphone and call again. This went on until Mike and Louie got pagers, which only expedited the process a little.

“What does Michael need now?” was Louie’s standard response. As the years went by, Mike got much faster and self-reliant. Eventually, Mike maxed out on pay and went looking for other opportunities.

“I bounced around for a while after that,” said Mike. “The late 80s was a crazy time to do HVAC because boards were starting to show up and the EPA became a thing. I think I got my EPA certification in ‘89. I received my cert card while sitting in a classroom with 100 other guys and free donuts.”

After some time working in medical refrigeration, Mike took a position at a hospital in Upland, CA for eight years. Then he answered an ad for a position at a nationwide refrigeration company.

The job was to conduct energy audits, but based on his resume, the company onboarded Mike as a supermarket refrigeration tech.

“That was two and a half years of craziness,” said Mike. “I’d never been in a rack room in my life, so it included lots of running around and learning.”

After that, he went to work for an HVAC company in SoCal for 12 years. That’s where he learned management, sales and operations. It was an amazing time.

But it didn’t last. What goes up...

2016 dealt Mike some heavy blows, right while he was at the pinnacle of his career.

“I’ve been partially blind in my left eye since I was an infant,” he explained. “It was never a major issue. I could drive. I could work.

Sure, it was an inconvenience from time to time, but life was normal.”

In 2016, Mike went in for a driver’s license renewal. As usual, he couldn’t read the eye chart well. Without ceremony or discussion, the clerk center-punched his license card and eliminated his right to operate a motor vehicle, declaring him disabled under California DOT law. He couldn’t even drive home from the licensing center.

“I tried everything to get my license back, but long story short, nothing worked,” said Mike. “I learned that Arizona law would permit me to drive, so my wife



and I moved to Phoenix. There, I took a job as service manager for the kindest man I'd ever met, Jerry Hahn, who owned Custom Cooling."

"Jerry and his family embraced us," continued Mike. "We didn't know a soul in Phoenix.

They helped us start a life here."

Three weeks later, Mike's dad was moved to hospice back in California. Mike drove back and spent the last three days by his father's side.

"My Dad died with a smile on his face," said Mike. "I asked the hospice nurse why."

"She said that my father was seeing heaven. I looked at her and said that I wanted to see heaven, too. She said that if I have any doubt about where I'm going, I needed to change my life so that there's no doubt. I don't know why she said it, but I needed to hear it."

Mike thought about his father's life, and his own. He realized that a major change he



GUY

needed to make was to live for others, instead of for himself.

Finding ways to help others

Mike took that mindset to work. He began empowering his co-workers.

Eventually, Hahn sold the company and Mike stayed on as a traveling safety instructor. This gave him even more opportunity to positively impact others in the trade.

Drawing from the setbacks he experienced personally over his decades in the field, Mike does everything he can to protect others in the industry. For example, working in supermarkets had robbed him of 80% of the hearing in his right ear.

"I don't want other technicians to end up like me," he said. "The vast majority of injuries in our industry are preventable."

At one point, Mike saw his daughter using a new app on her phone. He asked her what it was, and she said, "It's called Instagram, old man, and it's a photo sharing app for young people."

He downloaded Instagram in hopes of helping others learn, but he found very few HVAC accounts at the time. He started an account, but it didn't have a lot of value. A few years later, upon getting a new phone, he started his Instagram use in earnest, realizing that it held potential to reach a lot more tradespeople than his in-person training. The way he saw it, picking the right handle was critical.

"Throughout my career, when I showed up to a customer's location, I'd say, 'Hi, I'm Mike, your HVAC Refer Guy.'"

"That's how I came up with the handle when I started my second Instagram account with the help of my son," he explained. "My first logo was a random picture of an old barn in Beaver, Utah, but a graphic designer friend of mine said that it didn't convey what my account was about. He helped me build a real logo."

Over the course of seven or eight months, they worked on the logo, careful not to copy anyone else's design while including elements that Mike thought were important. After arriving at a final design, they patented the logo that Mike's followers are now accustomed to, including the moniker, "Keeping the HVAC/R Past Alive."

Originally, the account was just educational. Mike admits, however, that he's not the best graphics guy, and that there were people doing social media training and education a lot better than he was capable of. So, he focused on sharing the important content he found



and giving those creators the exposure they deserve.

"I still do that to this day," said Mike. "There are so many great educational content creators. However I can support them, I do. A lot of the content is safety related. I have 130k followers across all platforms. If I can use my reach to showcase wonderful content and potentially save one life, I'm closer to living for other people instead of living for myself."

Despite his social media success and the impact he has, Mike believes that social media came too late for him. For a while, he felt it was a struggle to remain relevant to an audience in their late teens, 20s and 30s.

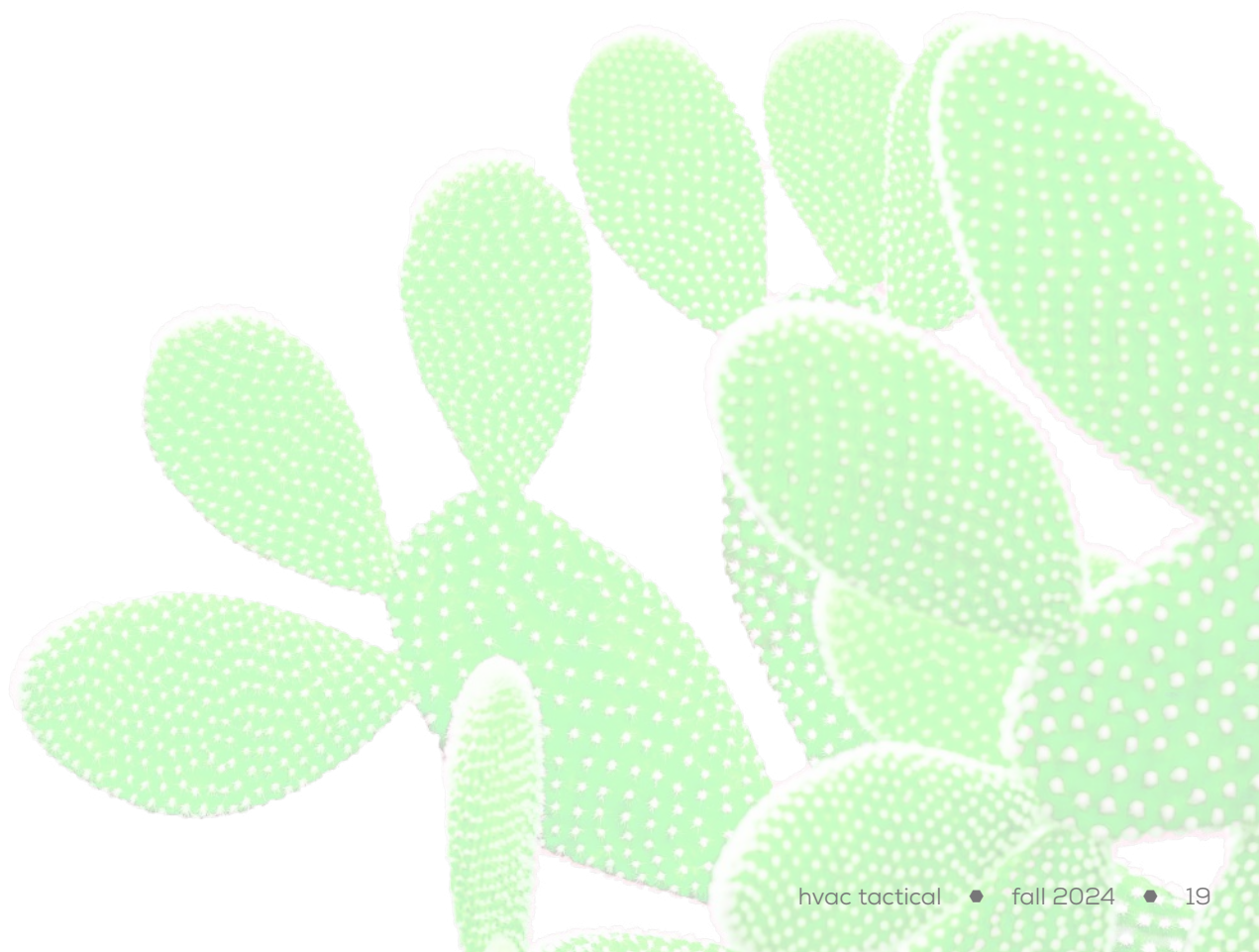
From the outside looking in, however, we know that workplace safety and a history of the trade are timeless. Mike's age and his career struggles are exactly what make him relevant to younger people. Very few people in their 20s have the experience he has. It's what makes him unique.

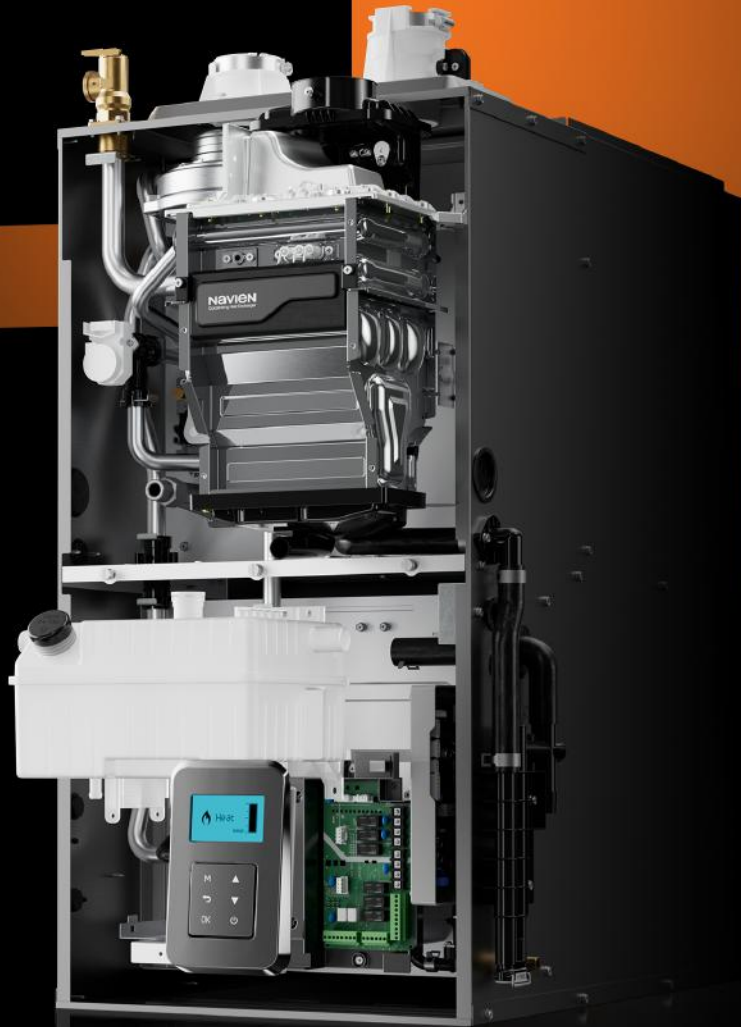
"My son, whose handle is @chiller_ben, is quick to remind me of that. He followed me into the trade without my prompting him. He now works for an international chiller manufacturer."

Now, at age 61, Mike can talk shop or social media with his son while educating people in person and online. He's raised a family and become a major asset to this industry.

By all accounts, that's a life well lived and a career well navigated.

Mike, however, fully attributes his success in life and work to the phenomenal people he has been surrounded by and partnered with since the very beginning.





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small acronym // big opportunities

greg crumpton

HVAC. What a broad topic.

Let us rewind a bit to when you were first learning the craft. I have never seen the finish line of learning, especially in a world such as ours that continues to evolve at a pretty stout clip, so that leads me to believe that there is no finish line.

Many folks get into the trade through family. Perhaps you are second generation, maybe you went to the “all-to-rare-these-days high school technical program” that opened your eyes to our trade, but many just kind of find their way organically. Regardless of how you got here, thank God you are with us on the journey. The journey ... Ah yes, that is what it is all about.

There are several “choices or routes” that will need to be or may have already been navigated as you make your way through your career in the HVAC trade. Many people get their first crack at the industry in the residential sector. This work can be rewarding, and in the long run, create an excellent financial return for those who genuinely want to hone their craft and stay with the residential sector. People often tend to think of the residential market as a stepping stone; it can be that. As you learn and grow, there will most likely be an opportunity for you to move on towards the light commercial, commercial, industrial and my particular favorite discipline, Data Centers.

I want to be clear, there is absolutely nothing more professional than a technician that masters his or her craft and stays within the residential market sector. True professionals that stay current on technology can increase their skills in dealing with the end users (customers), maybe even double-down on their ability to sell and then reap the financial benefits. This master-level technician is a destination, and it is a pure joy to see someone that aspires to be in that realm.

If you are inclined to use the residential route as a career-building step, then there are certainly ways to do just that. At a point in time, you will gain true confidence that comes through experience, not the “I got really good at getting stuff running” type of confidence, but the expertise that comes with technical maturity.

These milestones should include electrical proficiency, but not just confirming voltage and being able to work your way through a rudimentary wiring diagram. I am talking about truly understanding electricity. You should also master the vapor compression cycle. Many people can recite the four major components required for a refrigeration system to operate and more can tell you the additional components you or the OEM adds to aid in more efficient operation, but that is just the beginning.

The professional technician knows his or her subject matter stone cold. You can know the state of the refrigerant as it flows through the system and the pressures and temperatures as gas travels throughout it. You can understand what state the refrigerant is in at any given point within the system and when it passes through changes of state. Math and physics are the heart of every refrigerant pumping system, regardless if it is a reciprocating compressor, a scroll compressor, a screw compressor or a centrifugal machine. You are fully immersed; it is just second nature for you.

If you are so inclined, you may want to venture into the commercial sector of the HVAC arena. Here, things move a bit quicker, but with your knowledge, your experience and your grit, the pace doesn't matter. Things tend to slow down for you mentally, allowing you to get into the zone so that 3-phase power really does not intimidate you. You are prepared as you have

scaled your way through the industry. This is one more stop on the evolution ladder that you have been not only climbing since day one on the job, but have been building.

The basics and physics do not change. Yes, the tonnage and the equipment configuration may be new to you as you traverse this point in your journey, but having built the foundations of electrical and vapor compression knowledge, you can now soar. This stage of your career will enable you to learn even more. Yes, there are more components to the vapor compression cycle and more controls to understand to ensure you have the sequence of operation nailed in your head, but the guttural need is for you to engage and conquer the craft.

Another route you may choose is the industrial and/or data center HVAC world. Typically, when we are getting into these two realms we are talking about heat rejection versus air conditioning. This looks like extracting heat from one place (water, plastics, metal, cutting fluids, microprocessors, etc.) and rendering it somewhere else that is less objectionable, which is usually outdoors into

ambient air. For example, think about a company that has several 3-axial CNC machines running 24/7. Cutting oil/fluid will get hotter and hotter over time, and routing the fluid through a dry-cooler can keep it within its optimal temperature.

The destination your HVAC journey brings you to is totally up to you and only you. Having skills that are sought after at an incredibly elevated level, you can do what you genuinely want to do within this trade. It may take you a few jobs or moves to find your groove. You may start at A and realize you want to try B, only to find that A suited you better. The goal is to be engaged at a high level regardless of the specific realm of the industry you find yourself in, always be tactical in your approach and have your eyes wide open. Keep your internal radar attuned to what is happening and then identify the route you want to pursue.

Whichever element(s) you choose (yes you can master more than one), do it with excellence, high-integrity and always strive to perform at YOUR best.

about the author

Greg Crumpton is currently a Vice President at Service Logic. Since 2014, in his current role, Greg drives Service Logic's vertical market penetration in the mission critical segment and oversees EH&S across Service Logic and its operating units.

Greg joined Service Logic in 2014 with the sale of AirTight Mechanical the company he founded and led since 1999. As founder and president, he built a remarkable company that had a proven record and expertise in serving the mission critical market throughout the Southeast and is a foremost expert in mission critical applications, facilities, and HVAC.

Active with many trade associations and groups, Greg considers himself a Dot Connector, People Promotor, Technology Enthusiast, and a Guide to the Next Generation of Skilled Trades Workers.

As a published author and advocate for self-education and awareness, Crumpton invites you to purchase and read his book, deepKnowledge and explore how you are in control of your journey.

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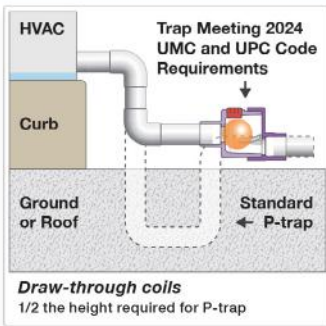
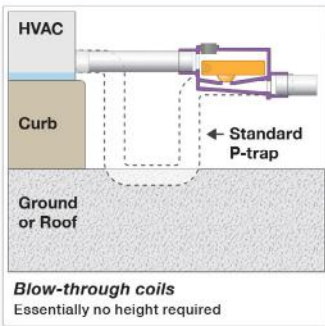
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costless appreciates more

fresno company: employees are more than numbers

dan vastyan

Angel Hernandez of Fresno, CA, had a knack for working with his hands since he was a kid, getting him an early start in the trades.

By the age of 20 he was on the grind, working with a local service and repair company with his own service van and running calls on his own. Whatever was assigned to him by his former boss, he would give 150% effort to get it done. After getting the run-around from this service company and disagreeing with certain sales tactics being imposed on techs at the time, Hernandez wanted to do things differently, and began considering self-employment.

Fresno was a growing city in 2002, so the local economy was ripe for an ambitious young man willing to hustle. Hernandez knew from the onset that if he was going to start his own company, he was going to do something his current employer never had.

"When I worked for someone else, my co-workers and I never got any appreciation for the work we did," said Hernandez. "I loved the company more than the owner did and worked really hard, but never got so much as a pat on the back."

At the age of 21, Hernandez purchased his own service van and founded Costless Plumbing, Heating and Air Conditioning.

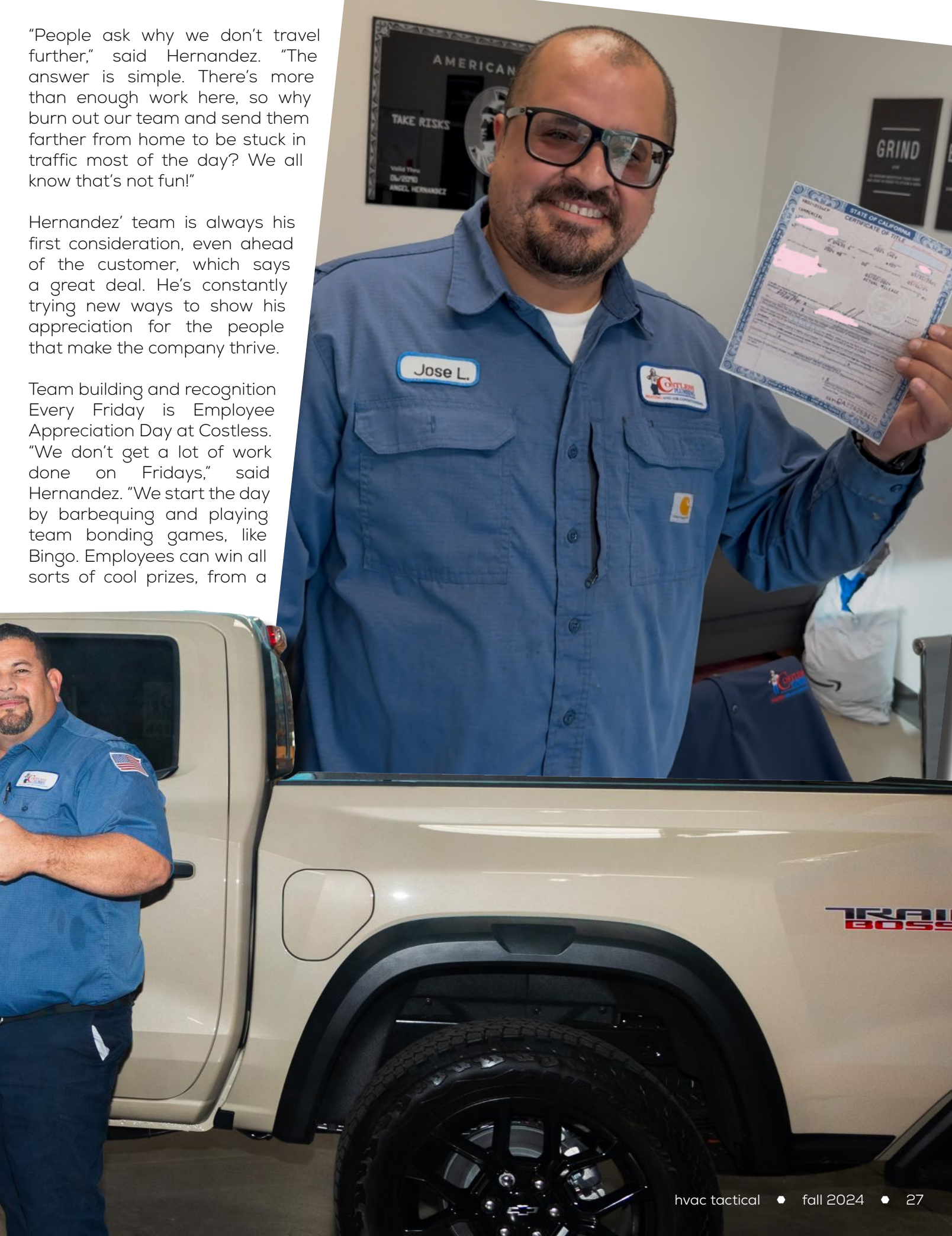
The company started in a two-bedroom apartment. After years of blood, sweat, tears and tiresome nights, Costless expanded to where it is today. It now occupies a new facility with 90 employees proudly serving Fresno with residential and commercial work.



"People ask why we don't travel further," said Hernandez. "The answer is simple. There's more than enough work here, so why burn out our team and send them farther from home to be stuck in traffic most of the day? We all know that's not fun!"

Hernandez' team is always his first consideration, even ahead of the customer, which says a great deal. He's constantly trying new ways to show his appreciation for the people that make the company thrive.

Team building and recognition
Every Friday is Employee Appreciation Day at Costless. "We don't get a lot of work done on Fridays," said Hernandez. "We start the day by barbequing and playing team bonding games, like Bingo. Employees can win all sorts of cool prizes, from a





smart, flat screen TV to cash. We don't start running calls until after the barbeque."

Over the years, the company has taken paid trips to Universal Studios, and one of their favorite escapes has been days spent on Millerton Lake.

"Lake days are a blast," said Hernandez. "Each summer, the whole team gets a paid vacation day and we rent multiple boats and jet skis. The first is a big party boat, while the others pull all the jet skis, tubes and other stuff. We spend a day on the water together and relax. It's one way I can show the team how much I appreciate their efforts, and it's a solid team building day, too."

This year, Hernandez stepped up his appreciation game.

"At the beginning of the year, we implemented a new appreciation and motivation policy," said Hernandez. "I wanted a new way to say thanks and incentivize performance."

Hernandez didn't want to incentivize sales, though. He's not a big believer in pushing sales for the sake of sales. What he wanted to drive was customer service, performance and initiative.

Under the new incentive program, team members get a raffle ticket every time they receive a positive Yelp or Google review, volunteer to work an on-call rotation or conduct a certain amount of work without a complaint or callback.

The raffle took place last month. Hernandez bought a brand new 2024 Chevy Colorado Trail Boss with title in hand and gave it to the winner, Jose Villalobos, who also received a paid day off work to celebrate with his family. The runner-up prize winner, David Gonzales, received a group of VIP Park Hopper tickets and an all-expenses paid trip to Disneyland. They had their own Disney cast member escort them to the front of the line for rides and behind the scenes to both theme parks for the whole day!

"Our team was motivated and performance was excellent before we started the new program, but this has definitely added fuel to the fire," said Hernandez. "Within several weeks of starting here, new hires learn that we're all dedicated, work hard and share a 'Yes we can' attitude. That's how we've grown from two people to 90 in twenty years."



COSTLESS PLUMBING

HEATING AND AIR CONDITIONING

Recruitment efforts

Even with an exciting, rewarding company culture, that kind of growth can be tough, for no other reason than lack of skilled manpower. Hiring is still hard, but not as hard as it was before Nathan, one of Hernandez' two sons that work in the company, suggested a change.

"I'm a private person, and I think privacy in business is prudent," said Hernandez. "I don't need my competition knowing every move I make. So, I've traditionally maintained as low a profile as possible, especially online. That went out the window a year ago, when Nathan decided we need a social media presence simply for recruitment."

Nathan was right.

Costless has arguably one of the best company cultures in California, but nobody really knew about it, especially young people who weren't already in the industry. So, he started an Instagram account to get the word out. After a few months, the company gained a lot of interest from younger techs and apprentices that will become the future of the industry. This has resulted in more than a few great hires.

"HVAC is finally experiencing a change in perception, but saying it that way doesn't do the industry any credit," said Hernandez. "The better way to say it would be, 'people in the trade are finally demanding the credit and exposure they deserve.'"





"I think this change is the result of how trade pros are carrying themselves, the exposure that social media provides, the efforts of select manufacturers and work being done by industry publications to change public perception," he continued. "Ben, at HVAC Tactical, has been doing an awesome job of promoting the idea that we should put our professionalism on display."

Plenty of hustle

Nathan, who serves as comfort advisor and installation manager in addition to social media manager, isn't the only second-generation Hernandez at Costless. His brother, Ethan, 19, is a certified crane operator and service tech.

Ethan is one of two in-house crane operators at the company. The big installation crew maintains a pace that requires Hernandez to own a crane.

"We can do 10-12 replacements a day," Hernandez explained. "We start work at 6am, and in the summers, we may still be taking calls at 8pm. Ethan did five lifts today by 3pm, then jumped in the service van."

A lot of their work includes rooftop and traditional split systems, but each day brings variety: unitary

heat pumps, mini-splits and VRF, all in addition to their plumbing work.

Angel still runs calls himself, but with the company growing each year, he's beginning to realize that he's assumed a new role by default: that of mentor.

He wants young men and women to realize that the trades offer outstanding opportunities and that you don't need a college degree to be successful.

There's better job security in careers that require tech school or in-field experience than those requiring a four-year college degree. This is especially true as equipment and tools become more sophisticated.

"I'm blue collar because I want to be, not because something went wrong in my life and this was a fallback," he concluded. "Many young people are beginning to understand this."

Hernandez also hopes that there's a business owner somewhere that will read about how Costless shows appreciation for its people and implements similar programs in their organization. After all, recruiting to the trade is only half the battle.

The other half is retention.



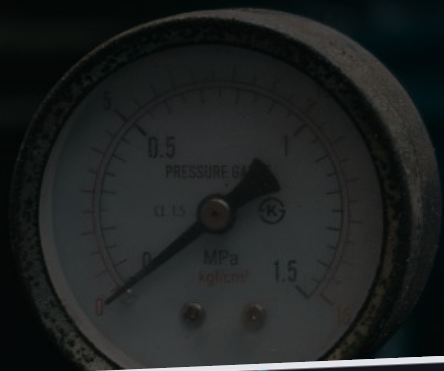
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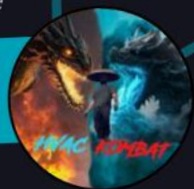
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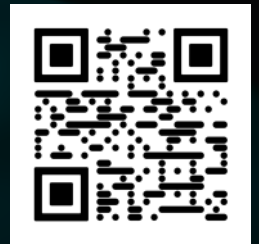
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1

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@tradesovercollege

the four pillars of indoor air quality

tim de stasio

Filtration

One of the most noticeable symptoms of poor indoor air quality is dust. Particulate Matter (PM) is a fancy word for dust and other solids that can float in the air and settle on tables, floors and in our respiratory system. We measure PM in micrometers (μm); 1 micrometer is 1/1000 of a meter. For context, a human hair is around 50 μm in diameter.

Particulate Matter that's 2.5 μm (PM 2.5) and smaller can pass right through most air filters as well as our upper respiratory system and settle into our lungs, and eventually get absorbed into our bloodstream which can cause a lot of health problems such as asthma, cancer, infertility and even dementia.

The American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) created the Minimum Efficiency Reporting Value (MERV) system to rate air filters. The higher the MERV rating, the better the capture rate for smaller particulates. If you want to improve IAQ for your customers, upgrading their filters to MERV 11 or even 13 is a great start, if possible. A MERV 13 filter reduces PM 2.5 by around 90%. It can even capture some viruses and other biological contaminants.

Face velocity across the filter is critical. Filter MERV ratings are tested at 300 feet per minute (FPM). If a filter is undersized, the actual MERV rating will be much lower. Imagine tossing a tennis ball at a chain link fence. If you gently toss it, it likely won't get through. But if you throw a ball hard enough, it's more likely to pass through. The same thing happens with dust and velocity.

When I sell a media filter kit upgrade, it also comes with duct modifications so that transitioning to a larger filter with more surface area keeps the velocity below 300 FPM, and the filter performs at its listed MERV rating. This will also reduce the pressure drop across the filter so you don't create an airflow problem.

Here's the formula: $\text{FPM} =$

This means that a 20X25 filter does not allow enough surface area for three tons at 1200 nominal CFM. How many 20x25 filters do you see with three tons and higher in the field? I see a lot.

In addition to measuring the size of PM in the air,

we also want to measure the concentration of these particulates. A widely used unit of measuring PM concentration is micrograms per cubic meter ($\mu\text{g}/\text{m}^3$). Healthy air quality is under 12 $\mu\text{g}/\text{m}^3$.

Above MERV 16, a filter can be classified as a High Efficiency Particulate Air (HEPA) filter. For this level of filtration, a HEPA filter has to employ multiple mechanisms of capturing particulates.

HEPA filters create a sizable pressure drop, which can create airflow challenges. In residential applications, HEPA filter kits are usually fan powered units that bypass a portion of return air, passing it through the HEPA filter instead.

Even if your customer doesn't have the budget for a HEPA or media filter upgrade, you can greatly improve the PM control by sealing the ducts, and ensuring the existing filter properly fits inside its rack with no bypass air.

Humidity Control

Humidity control is essential for reducing multiple types of airborne pollutants. Air that is excessively dry allows particulates to stay airborne longer; these can carry germs and viruses on their back. Some viruses and bacteria can thrive under 40% relative humidity (rh). If humidity is too high, mold and other biological growth have the perfect breeding ground. High humidity is also linked to more VOC off-gassing and reduced effectiveness of carbon filters.

Dewpoint is the temperature that condensation will form. Keeping indoor dewpoint under 60°F will prevent condensation, since there shouldn't be any exposed surfaces under that temperature. At a molecular level, moisture molecules start organizing in layers. Above 60% rh, these layers can form a microscopic droplet of water that allows biological growth to proliferate. Therefore, I suggest the 60/60 rule: keep relative humidity well under 60° dewpoint and 60% rh.

Air Conditioners dehumidify as air passes across a cold evaporator coil that is below dewpoint, and the moisture condenses and drains out. An oversized AC won't dehumidify well because it short-cycles. In between run cycles, and for the first few minutes of the cooling cycle, the coil isn't cold enough to do

any dehumidification. A properly sized AC is better, and a multi-stage or inverter system keeps the coil under dewpoint for longer periods of time. But even that may not be enough to properly control humidity during very humid weather and part-load conditions. For example, in many climates, during July and August at night, or when extended periods of rain occur, there is still a very high latent moisture load but not enough sensible heat load to keep the AC running.

For this reason, I sell a lot of whole home dehumidifiers as part of a multi-point solution package. These can be connected to the HVAC ducts or be independently ducted and controlled. Many newer dehumidifiers have strong internal blowers that can overcome the HVAC duct static as well as MERV 13 filters, so they combine several pillars of IAQ in one device.

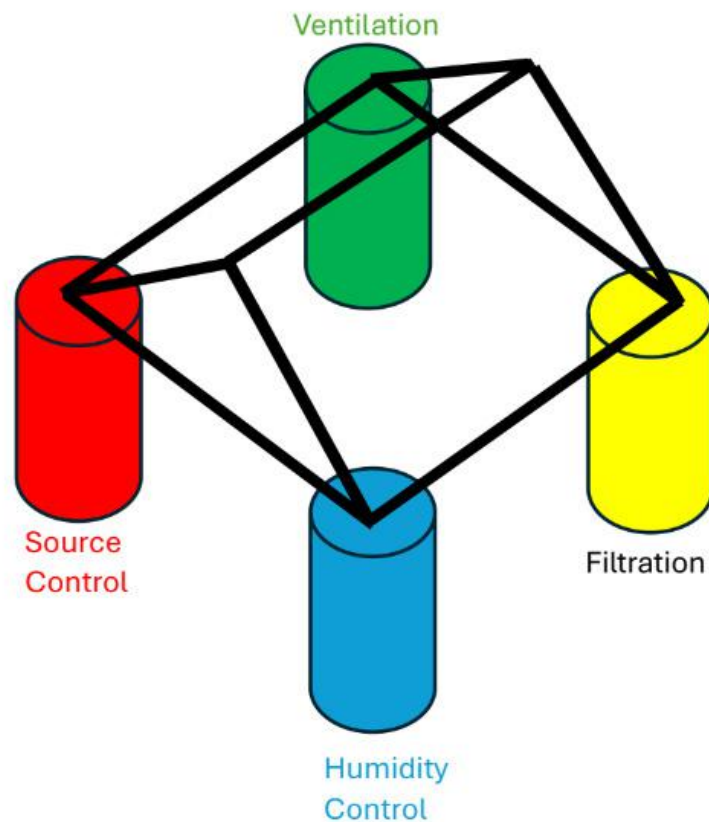
Air that is too dry isn't healthy either. Dry air under 40% rh can cause sinus irritation. Fine particulates can float in the air for longer periods of time instead of settling on surfaces. In winter, many climates create conditions that require buildings to have a form of humidification.

Ventilation

Buildings tend to build up pollutants in gaseous form over time, especially in newer homes that are built tighter than ever before. These pollutants are small enough to pass through air filters. They include Carbon Dioxide and various Volatile Organic Compounds (VOCs). In addition, viruses and other biological pollutants in aerosol form are small enough to pass through filters under MERV 13. The solution to reduce these pollutants is to dilute them with outside air. This was found especially effective in commercial buildings during the pandemic.

Outside air ventilation comes with some drawbacks, though. Outside air can have other pollutants, namely particulate matter from wildfires, yardwork, tree pollen and others. It is best to pass outside air through a MERV 11 or higher filter. If possible, limit fresh air when the local air quality index number is poor.

The HVAC system must be sized to handle the additional heat and humidity load from fresh air. Energy Recovery Ventilators use a desiccant wheel that can exchange the heat and humidity between indoor and outdoor air to reduce these loads, but many ERV's are only 65% effective, which means that 35% of that energy still has to be handled by the heating and cooling system.



My preferred method in most homes in humid climates is a ventilating dehumidifier. This strategy mixes fresh air with room air and passes it through a dehumidifier which dries it before introducing it into the space. Depending on the building's air tightness, this strategy can pressurize the building, pushing conditioned air out instead of allowing bad air in.

Although ventilation in HVAC typically refers to dilution air, there are other forms of ventilation that are just as important. Circulation of air allows it to pass through the HVAC system and be filtered and dehumidified. Avoid stagnation with good duct and register design so humidity and other pollutants don't "pool" in areas with poor distribution.

Shoulder seasons present challenges for ventilation because the HVAC system runs less. That's why I like to employ efficient ceiling fans that run at a slow speed to constantly churn the air. Use a ventilation control that circulates air through the HVAC system and filters either on a timer or on demand, such as what the Haven IAQ offers.

Source Control

Source control refers to preventing air pollutants from entering the space in the first place, so there is less work that the filtration, humidity control and ventilation systems have to do. This is similar to a good diet and exercise regimen that prevents other

health problems that have to be addressed with medicine and surgery.

One of the best methods of source control is to air seal the building and ducts. Air leaks add up in the aggregate and introduce heat, humidity, particulate matter and chemicals. Sealing these leaks reduces the natural forces that pull in these pollutants.

Another cause of poor indoor air quality is building pressure. A building can experience periods of depressurization, such as when kitchen and bath exhaust run without sufficient make up air, or if certain areas become depressurized when interior doors close. For example, a home with one central return and not enough passive returns in bedrooms can experience negative pressure in the main body of the house. Negative pressure can pull moisture, particulate matter and even chemicals from attics, crawlspaces, wall cavities and the outdoors.

To determine if a home is experiencing depressurization problems, you'll need a micro-manometer such as what Retrotec and The Energy Conservatory offer, so you can accurately read Pascals (Pa), a very small unit of pressure measurement. For context, 24.8" inches of water (wc) equals 1 Pa. You can get a good picture by running the HVAC while keeping doors closed and reading the pressure difference between rooms and the main body of the house, and the main body of the house to the outdoors. But, you'll need to understand how leaky the house is for those pressure readings to make sense by using a blower door. A leaky house may not read a high depressurization, but that doesn't necessarily mean there isn't a problem; it's just not able to build pressure.

Air sealing and installing passive returns like jumper ducts are common recommendations that I make to reduce the sources of air infiltration that drive air through these leaks. As an HVAC contractor, you could also offer air sealing services during your slow season or partner with a weatherization

contractor. A blower door allows you to test-in during the diagnosis, then test-out to quantify your improvements.

Home Chemistry

My strategy for improving Indoor Air Quality (IAQ) is to "remove things out of the air, not add things to it". There are no shortage of electronic air purifiers and cleaners on the market that use a variety of technologies, including ionization and oxidation. Some of these products have the potential to add harmful pollutants as a result of chemical reactions between the purifier and what it is trying to remove. Ionizers have the potential to add ozone, and so do some UV lamps that operate at a certain wavelength. Ozone is harmful even in small doses. On the other hand, oxidation has the potential to turn everyday chemicals that we use to clean our home into harmful byproducts like formaldehyde, which has been linked to cancer. Sure, these units are tested in controlled labs, but there is a big difference between a lab and an actual building's chemistry.

As HVAC contractors, we are not chemists. We can't possibly account for the variables in chemicals in the home, air distribution, the purifier's technology and its degradation over time. The four Pillars of IAQ remove pollutants from the air without adding anything to it. While not all air purifiers are hazardous, I have found by addressing these four pillars and measuring the air quality, there is little need for any additional technology that can introduce chemistry into the air.

If these are installed afterwards, their purpose is "air maintenance" instead of remediation.

No doubt, the demand for better IAQ will continue to increase. As technicians and contractors, we have an ethical responsibility to understand the science and only offer solutions that are proven safe and have measurable results. Filtration, ventilation, humidity and source control are the best way to do just that.

Tim De Stasio

Tim De Stasio is an HVAC contractor in North Carolina. With over 25 years of experience in residential, commercial and industrial HVAC, he now specializes in residential design and home performance. He also is an educator and trainer and is willing to share his experience in the classroom and on many social media platforms as @timdestasiohvac.

He has worked as a brand ambassador and technical consultant for Haven IAQ, Retrotec, Santa Fe Dehumidifiers, measureQuick, The Energy Conservatory, Conduit Tech, the #betterHVAC movement and many others.



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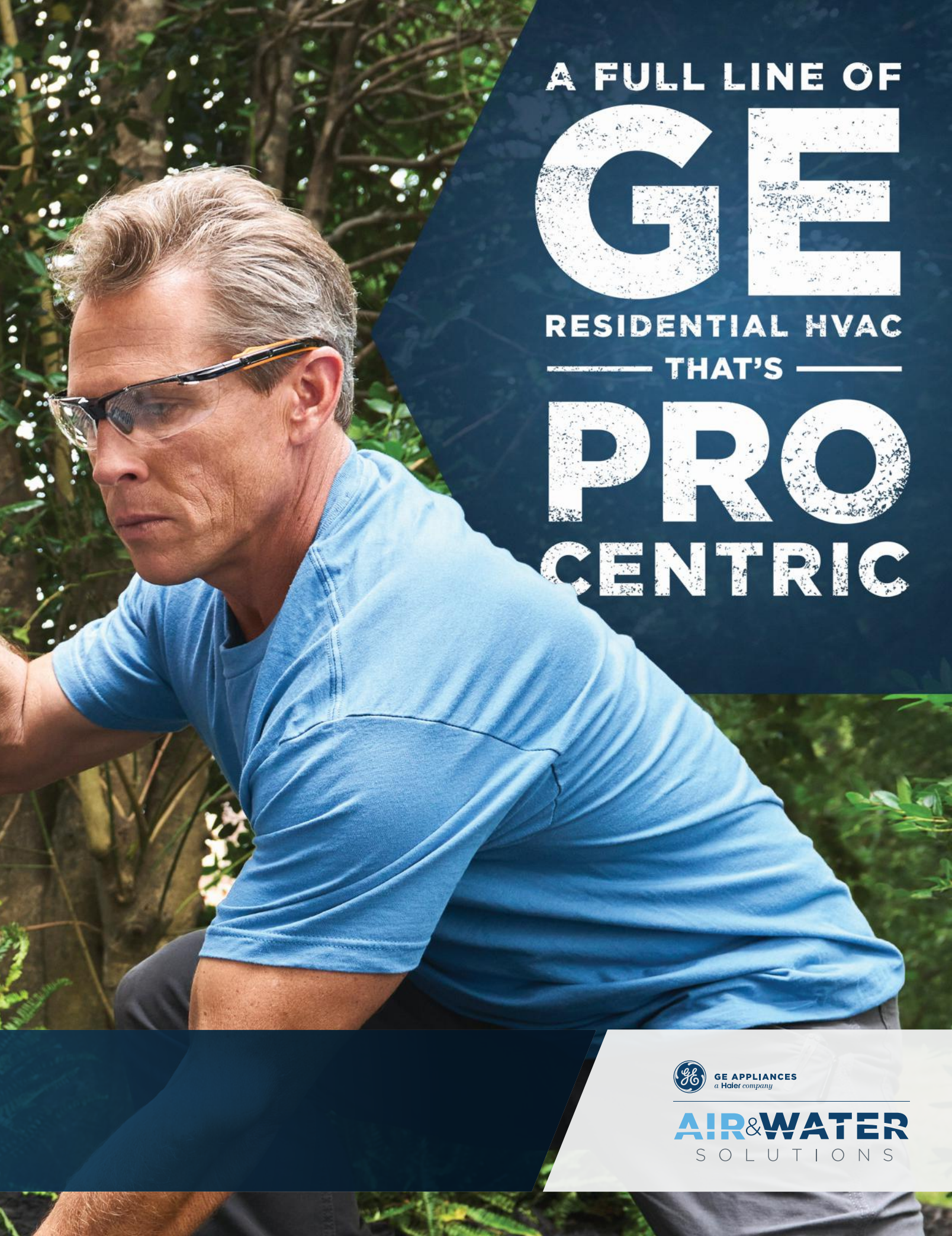
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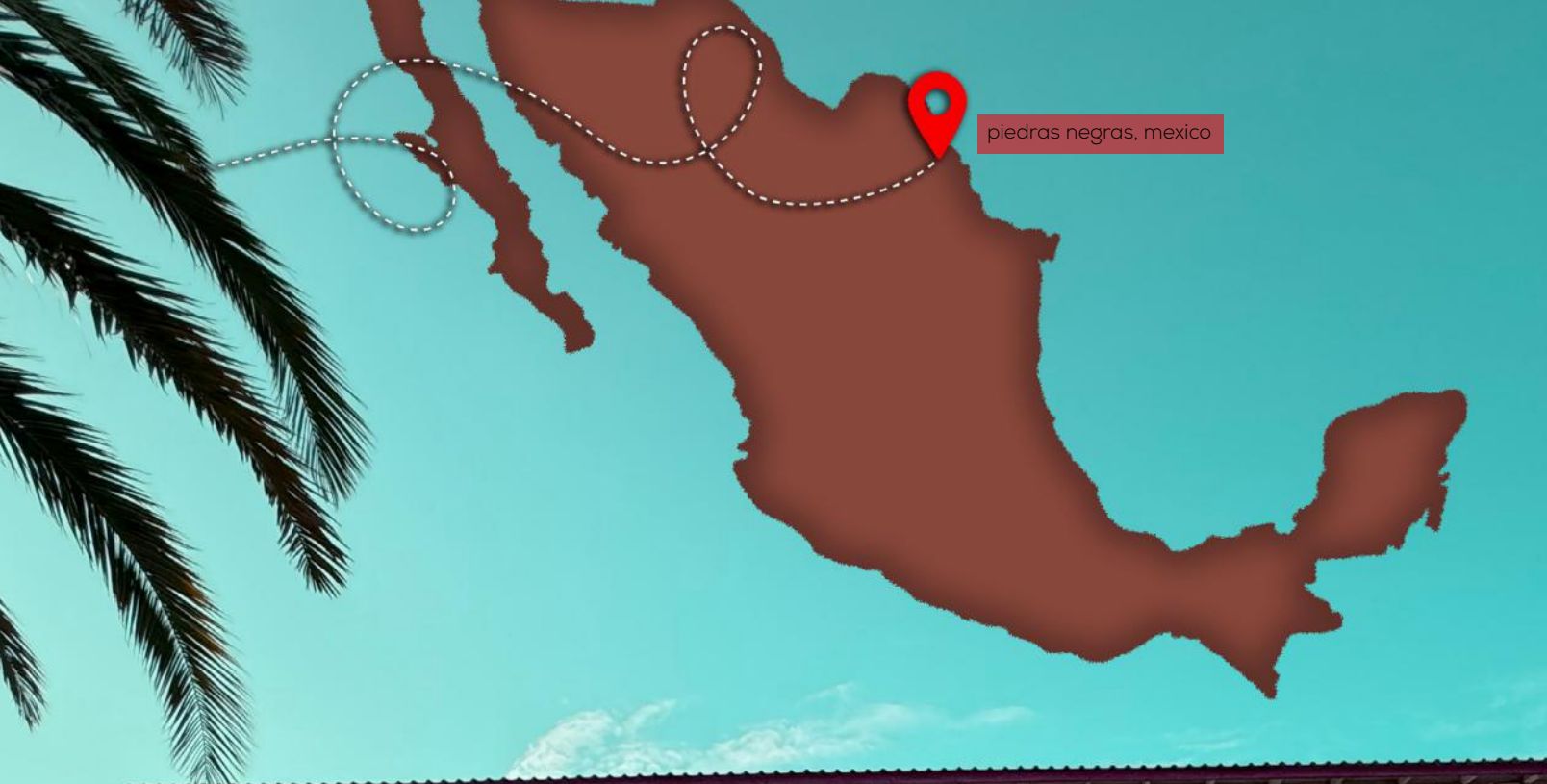
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grinding out the **mexico** project

rebekah poole



If you haven't yet met **Zac DesJardins** (in-person, online or in the pages of this very magazine), it's time. An HVAC contractor out of Nashville with a penchant for efficiency, he has over 100,000 subscribers to his YouTube channel, @QualityHVACR, who are eager to see his content.

While Zac is a particularly bighearted human being, this piece is not about him specifically. Rather, it's about a project he spearheaded under his new brand, Trade Grind, that focuses on supporting the trades community through strengthening skill sets and personal growth. Trade Grind's push to work with purpose echoes throughout the project, from planning through execution, and on into purposeful afterthoughts.

Let's rewind.

At the last HVAC Tactical Awards, DesJardins was asked on the red carpet what everyone could expect from him coming up.

His answer: he was focusing on "doing more charity work" for 2024. Little did the rest of us know that plans for his first charity project started that very week. And it began with a man named Eli Garcia.

Initially introduced to Garcia through Garcia's brother Jesse, DesJardins' coordinator, the three men started planning what would eventually come to be called The Mexico Project. The project is a multi-phase improvement of a children's summer camp run by Eli and his wife, Mandy.

It consists of a property just outside of Piedras Negras, Mexico, across the border from Eagle Pass, Texas. With dormitories, outbuildings and a main hall, the youth camp features summer highs of 100+ degrees and nary an A/C in sight.

The camp is an offshoot of, and supported by, Vida Nueva Ministries—a church and private K-12 school within Piedras Negras, where the Garcia brothers were born. It was originally founded by Mandy's parents long before she and Eli eventually took over the running of the church, school and camp.

During planning, Zac and the Garcias split the initiative into phases. They determined phase one should be turning an old shop into four usable rooms for campground staff to live. This consisted of installing a four-zone ductless system, which sounds straightforward enough.

However, readers of the mini split article can tell you there are a number of subtleties during installation that completely change the lifespan and maintenance needs of a mini split.

Phase two will be installing similar systems onto existing dormitory buildings for the children. And phase three will be to cool the Main Hall, which serves as an event space and general meeting area for the camp. With the help of volunteers and generous donations of equipment, tools and supplies from six different companies, Trade Grind spent one and a half days completing phase one this September.

Trade Grind (Zac and Jesse) and HVAC Tactical's Ben Poole and Efren Martinez all arrived in Piedras Negras together on Mexico's Independence Day. To them, the fireworks and celebratory air not only felt like a personal welcome, but like a cosmic nod to their purpose there. As a local, Jesse became the de facto guide and interpreter for the duration of their stay.

Cesar Morales and his wife, Azul Legazpi, who are owners of an HVAC company in Mexico City, came along to lend a hand with the installation, as did two of their employees, Victor Molina and Francisco Resendiz. The Morales drove 16 hours to be a part of the endeavor. Cesar had been following DesJardins on YouTube before the two met at the Chicago AHR Expo last January. Morales told him they see all the great new tools on Instagram, but it's hard to get them in Mexico's supply houses. Cesar and Jesse quickly struck up a friendship, making it only natural to include him in this service project.

In a serendipitous twist, Cesar Morales had already met an RLS representative in Monterrey at AHR Mexico last year. With their grass roots approach to marketing, preferring to put tools into the hands of technicians rather than running large advertising campaigns, RLS knew that this giving-back project was a natural collaboration and the perfect place to donate their press kit and fittings.

Previously partnering with Zac, GE Air & Water could see that his vision for this project mirrored their commitment to being invested in the global community. Annually, they give employees an opportunity to make a meaningful impact through their "Blue Wave" effort, volunteering 15,000 hours of community service, and they were happy

to extend that impact beyond their employees for this endeavor. They donated both the mini split units and other equipment needed for the project's installation.

As a company, Refrigeration Technologies is all about maintenance and has kept a strong focus on education. When they learned that Trade Grind would be teaching local staff the proper cleaning and maintenance of the new units, they knew this project was a good fit for them. They gave one year's worth of non-toxic coil cleaners from their Viper line and additional funds to cover travel expenses for the team.

Tru Tech Tools was quick to add to the donations list when asked. With a desire to have a greater impact in the wider world rather than simply within the HVAC industry or the U.S., they donated and worked with tool manufacturers to get a vacuum pump, recovery machines and tubing tools into Zac's hands, plus other items they thought would be needed for this undertaking.

Line Sets Inc. came to the project through a side channel: their sales representative from Leone Green, Trevor Dehmlow. He and Zac are friends and neighbors with overlapping philosophies about life and work, namely that forming relationships and making connections are much more fulfilling than simply executing the requirements of a job. After asking DesJardins what else he needed for this project, Dehmlow approached Line Sets Inc. about donating pre-insulated copper line sets. To their credit, the corporation understood that Zac and his team, all juggling the busy schedule of a contractor, were taking time out of their work and lives to go to a foreign country and help those less fortunate. This was a no-brainer to them.

Building great relationships very much came into play when Diversitech became involved. DesJardins has been their trusted partner for some time. They already knew the value of Zac's relatability—his ability to teach and present solutions in an easy-to-understand way—and how pivotal that is to expanding the reach of not only his content and their products, but also who he and his sponsors are able to serve together. They offered line set covers, disconnects, whips, condensate pumps and mounting feet to finish out the installs and support Zac's initiative.

It took a well-thought-out team of working hands and donations to make it happen, and make it happen they did. After installing the system for the staff rooms, Trade Grind took the time to educate the facility manager on how to maintain the equipment, provided the Viper cleaning products donated by Refrigeration technologies and then surprised Cesar, Azul and their





employees with the tools they used for the job—all \$4,100-worth donated by Tru Tech Tools plus the \$4,500 RLS press kit and leftover fittings. Not to be left out of the pay-it-forward vibe, Cesar made service calls and performed repairs there in Piedras Negras during their stay.

So, what's the next step for The Mexico Project?

Eli and Mandy have been living in a small house on the school campus while their Eagle Pass home is being remodeled. About 60 days before Trade Grind arrived in Mexico, though, Garcia was diagnosed with cancer. The remodeling costs added to the cost of cancer treatments has put a huge financial strain on the couple who spend all their time working with the children in Piedras Negras.

Though it's not strictly part of the project itself, this coming spring, Trade Grind plans to replace two units on the Garcias' Texas home to help them get back into their own house.

In the meantime, Trade Grind is illustrating how the normal everyday reality of being in HVAC is not so far removed from giving back. There's a fundamental service aspect to being in the skilled trades. In fact, it extends beyond the basic customer-service relationship.

We've all seen it within our professional community, with a willingness to help and uplift each other as peers and colleagues. Part of the purpose Zac has assigned to Trade Grind is to encourage others to get in tune with what they do every day, see it as

more than paycheck and find the joy in the job. From there, serving others is a natural next step. With the level of talent in this industry, there is no limit to the ways we can build up communities, share through education and utilize collaboration to make a difference in the lives of others.

You'll find Trade Grind's Mexico Project videos up on Zac's YouTube channel where you can see the project unfold for yourself.



The HVACR Education Game Changer

renee tomlinson | esco institute

an HVACR professional in the digital age.

For decades, HVACR education followed a pretty consistent blueprint: textbooks, lectures and some hands-on training. But then, seemingly overnight, things got a little more, well, social. Suddenly, hashtags like #HVACLife, #TechTips and #WomenInHVAC were lighting up our feeds, creating a virtual classroom that shattered geographical boundaries and brought knowledge-sharing into the palm of every tech's hand.

We've witnessed firsthand how social media has not just tweaked the game for HVACR education; it has completely rewritten the rules. The transformation goes far beyond the old days of posting to Facebook or LinkedIn about a new product. We're now looking at a movement where HVACR pros aren't just showing off shiny new installs or time-lapsed coil cleanings—they're actively educating, learning and redefining what it means to be

The Classroom is Everywhere Now

Remember when learning meant attending a scheduled course or hitting the books? That's still happening, of course, but today's technicians are supplementing their knowledge through social media feeds that serve as mini-training sessions. Instagram reels, YouTube shorts and TikTok tips have become fast, easily digestible and—most importantly—relevant to the tech's day-to-day grind.

At ESCO Institute, we embrace this shift. We've seen how our weekly webcast and podcast, which cover everything from new refrigerant regulations to tech tips, have expanded our reach beyond traditional classrooms. It's about meeting techs where they are—in the field, on the go and even during their lunch break. Social media platforms have blurred



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Learning in Real-Time: The Power of Community
What used to be a solitary profession has evolved into a thriving community of techs who share and solve problems together—often in real time. Got a tricky compressor issue at 8 PM? Snap a pic, post it with the right hashtag, and watch the community jump in to offer insights and solutions. You're not alone on the job anymore; your followers and fellow techs have your back.

The Temp Talk community we launched on the HVACR Learning Network is a perfect example of how social engagement brings people together. It's not just a forum for complaints or anecdotes—it's a place where educators, techs and even industry leaders engage in real-time discussions about evolving technologies, changing regulations and emerging best practices. It's peer-to-peer learning, but on a grand scale.

Influencers: Not Just for Fashion Anymore

When you hear "influencer," you might think of fashionistas or fitness gurus. But the HVACR world has its own influencers—people who have built a following not by showing off luxury lifestyles, but by consistently delivering valuable content that helps techs level up. They're the new industry educators, and they're making an impact by blending practical advice with digital savvy.

What's great about the network? You don't need to be a seasoned veteran to add value. If you're a young tech who just figured out a more efficient way to complete a task, your experience can help someone else. It's not about who's been in the game the longest—it's about who's bringing something fresh to the table.

Hashtags are the New Learning Modules

Let's talk about hashtags. They may seem like digital clutter, but they're actually a new way of organizing knowledge. Searching for #LowGWP or #A2LRefrigerants brings up a wealth of content, from safety videos to equipment reviews. It's a new-age index for HVACR information that encourages techs to dive into topics at their own

pace.

Platforms like Instagram and LinkedIn have turned hashtags into mini training modules, connecting techs with up-to-date information. This is crucial in an industry where technology and regulations are changing faster than a condenser fan on a hot summer day. Hashtags give techs access to the latest content, so they can stay current without feeling overwhelmed.

The Rise of HVACR Content Creators

It's not just the big-name companies pumping out content anymore. Independent techs with a passion for sharing are creating valuable resources, from "how-to" videos to live Q&As. They're turning their phones into pocket-sized production studios and their vans into classrooms on wheels. And guess what? It's working.

These content creators, who might have started with just a smartphone and a few ideas, have become micro-educators, and their followers aren't just passive viewers. They're engaging, asking questions, offering feedback and creating a two-way street of learning. It's a natural extension of what we do at ESCO Institute, where our goal has always been to make quality education available to anyone who seeks it.

Navigating Information Overload

Of course, with all this information at our fingertips, there's also a risk of misinformation. Not every "quick fix" video or training tip you find online is gold-standard advice. That's why it's crucial to differentiate between credible sources and content that's, well, a little shaky.

As social media becomes an ever-larger part of HVACR education, organizations like ours at ESCO Institute are working to ensure the quality of information that circulates. We're encouraging techs to vet the content they consume and to look for reputable certifications or trusted voices in the community. Not all information is equal, and discernment is key to navigating this new educational landscape.

The Future: Hybrid Learning Models

The future of HVACR education lies in hybrid models that blend traditional methods with social media-fueled learning. We're not throwing out the textbook; we're adding to it. Platforms like the HVACR Learning Network are combining digital content with live interactions and social elements, providing techs with both structured courses and the flexibility to learn on their own terms.

As we move forward, expect to see more content tailored for social platforms, more live streaming of technical demos and more partnerships with influencers who can bring real-world experience to the virtual classroom. Social media isn't replacing traditional HVACR education—it's supercharging it.

Wrapping It Up

Social media has changed the HVACR education game in ways we never saw coming. It has turned learning into a 24/7 activity, created real-time

problem-solving communities and introduced us to a new breed of content creators who aren't just showing us what they know—they're teaching us how to do it.

So, let's embrace it. Let's follow those hashtags, subscribe to those channels and keep sharing the knowledge. Because in this brave new world of HVACR education, the social network isn't just a place to connect—it's a place to learn, grow and evolve. It's a mindset.

By embracing these trends, HVACR professionals can stay ahead of the curve, while organizations like ESCO Institute will continue to bridge the gap between traditional and modern learning. The HVACR game has changed, and it's time to play.

Are you ready?

#HVACGameChanger

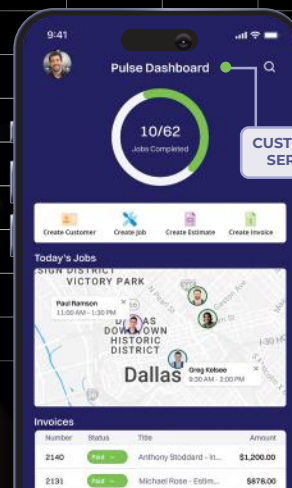


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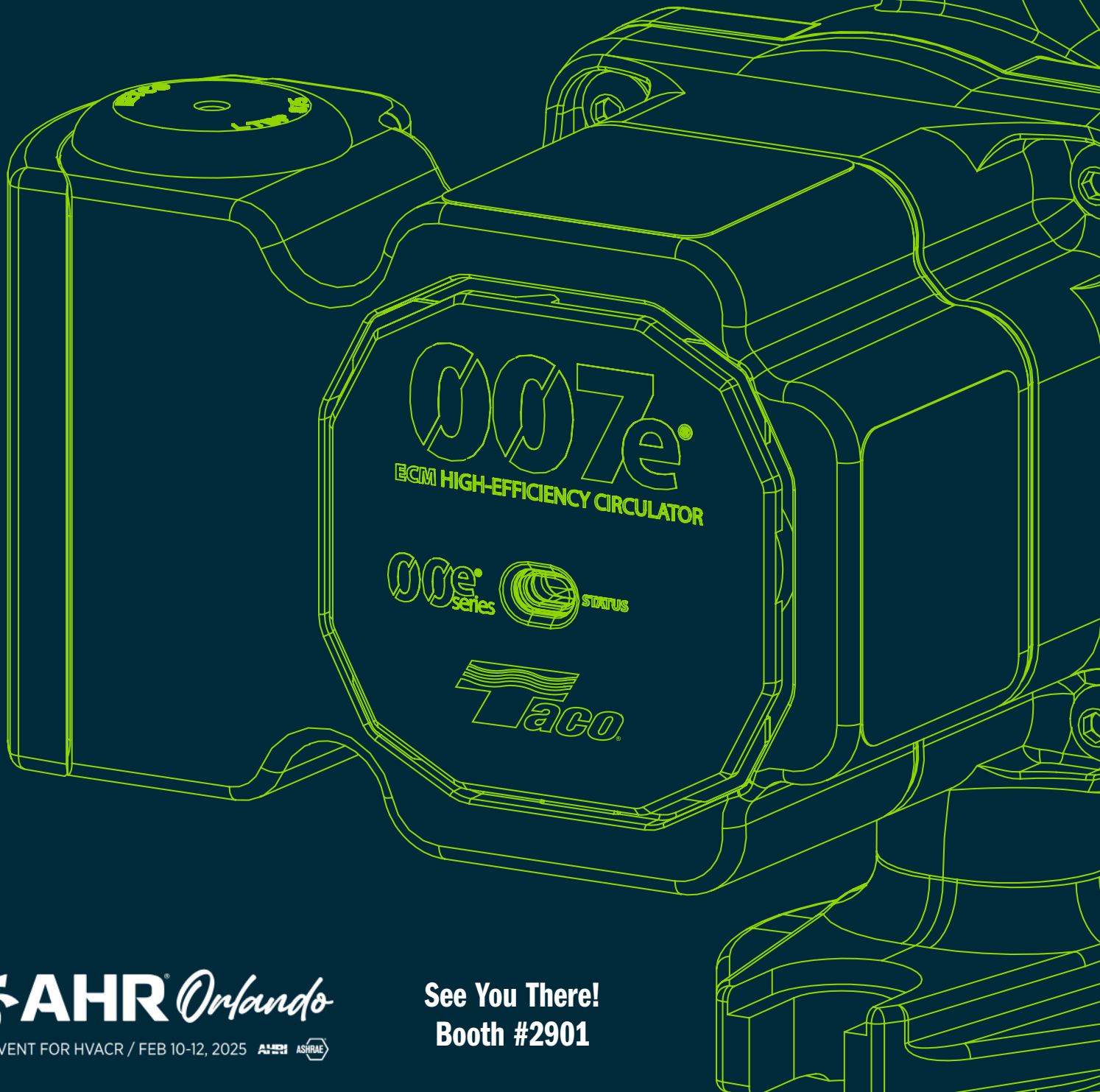


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We live in the age of continuous advancements, and as usual, the HVAC industry is also seeing the transformation with machine learning-driven automation coming into practice. This transformation is more than just improving the mechanical side of things, but changing how HVAC technicians operate.

Automotive technology has come a long way; it is now empowering the workforce with smart diagnostic tools, AR (Augmented Reality), voice-activated assistance and advanced analytics to display their capabilities in an efficient and precise manner. This is discussed in the cutting-edge tools article, including practical applications, benefits to HVAC operations and challenges and future prospects of implementing them.

Part 1:

AI and Automation-Powered Smart Diagnostic Tools

As the integration of AI and automation is expected to improve HVAC efficiency, various smart diagnostic tools continue to emerge. These technologies fasten diagnosis and increase its accuracy for easy troubleshooting maintenance, making them a must-have soft hardware for modern-day HVAC needs.

Fieldpiece Job Link System

Overview: The Fieldpiece Job Link System works with various company tools to offer HVAC system data to technicians on their mobile devices. This system collects and processes data in real-time for faster decision-making on-site.

Impact on Work: The Job Link System delivers in-depth diagnostics and performance analytics to help technicians quickly identify HVAC problems for faster remediation - meaning less guessing or manual testing.

Efficiency Gains: Technicians using the Job Link System say they can reduce time spent on diagnostics and troubleshooting up to 30%. For example, a case study across multiple HVAC companies showed that implementing this system reduced callbacks by providing accurate diagnostics, which enhanced both customer satisfaction and operational productivity.

Integration Challenges: While the Job Link System is beneficial, training is required before technicians can fully make use of its features as the system can be difficult for those unfamiliar with new technological nuances. Other major barriers are adaptability to existing systems and the learning curve that comes

with implementing new software.

Future Outlook: With further advancements in AI and data analytics, smart diagnostic tools can become even more sophisticated to provide ultra-precise diagnostics and predictive maintenance. IoT device integration may mean more connected systems, resulting in even stronger insight into HVAC efficiency and performance for technicians.

Testo Smart Probes

Overview: Testo Smart Probes are small, wireless probes that connect with an onboard mobile app to log and share important environmental information (like present temperature or humidity).

Impact on Work: These probes allow for easy diagnosis and system check without equipment setup and cumbersome data collection points throughout an HVAC.

Efficiency Gains: Testo can increase efficiency by 15%. When technicians integrate Testo Smart Probes into their work, they decrease the time spent on system diagnostics by an impressive 25%. Smartphone direct data transmission allows for instant changes and faster decisions, ultimately cutting down on the return visits between scheduled maintenance.

Integration Challenges: Technicians are being asked to learn how to seamlessly manage new digital tools and interpret data more carefully with Testo Smart Probes. The upfront technology and training investment is significant, especially for smaller companies.

Future Outlook: In the future, increased use of sensors and integration with other smart home systems will only increase the usefulness and efficiency of tools like Testo Smart probes. With the advent of cloud computing, the capability to utilize real-time data analysis and integration with HVAC systems is enormous, opening up new opportunities for improved efficiencies and predictive capabilities.

Part 2:

AR On-Site Assistance for HVAC

The HVAC industry is one of the industries that is being revolutionized with Augmented Reality (AR) in terms of how technicians interact with systems on-site. Using AR, Technicians can view parts of a system's components and data overlays right in their real-world environment for accurate and efficient maintenance and repair operations.

Vuforia View

Overview: Vuforia View is an AR app that HVAC technicians can use to look up digital overlays of schematics and live data available on their devices. The app uses the camera of a Smartphone or Tablet to project information over the system's physical components.

Impact on Work: Vuforia View makes it faster and less likely that technicians must actually take a device apart to see clearances of internal components or operating conditions.

Efficiency Gains: According to a case study with a regional HVAC service organization, Vuforia View reduced the time technicians spent on system diagnostics by about 40%. Technicians could easily and quickly identify problems by overlaying digital information on top of real-world systems.

Integration Challenges: The major challenges companies face today are hardware compatibility and extensive training to fully leverage AR technology. Certain technicians may be unable to use AR if their smartphones are older and don't support this feature.

Future Outlook: The future of AR in HVAC is moving toward increasingly deep integration, possibly bringing in mixed reality technologies that combine the benefits and features of AR with Virtual Reality (VR) to provide more holistic training and diagnostic solutions. But much like with hardware, adoption rates can expect to increase as the technology grows, becomes more cost-effective and matures.

Microsoft HoloLens

Overview: The Microsoft HoloLens is a standalone AR headset, so it does not require a Smartphone. By leveraging next-generation sensors and computing power, high-definition holograms are seamlessly placed in the user's actual surroundings.

Impact on Work: HoloLens provides complex instruction and immersive diagnostics on the equipment. Techs are working to provide more insight into what is wrong, reducing time spent on the problem.

Efficiency Gains: The deployment of HoloLens in a multinational HVAC company decreased the repair time by half and improved first-time fix rates (FTF) by up to 20%. Remote experts could also see the same field of view and communicate directly with technicians to provide real-time support, thereby reducing revisits.

Integration Challenges: Some integration headaches revolve around the high costs associated with devices that require constant software updates and maintenance tasks. The headset's physical design may also not be compatible with all field environments (especially extreme weather conditions).

Future Outlook: Wearable AR technology like the HoloLens is anticipated to continue in development - becoming even more comfortable with better battery life, processing power and more. Inclusion with IoT devices and cloud computing might lead to even more dynamic, responsive use in field service applications, such as predicting maintenance issues while still latent.

Part 3: Voice-Activated Help For HVAC Professionals

Powered by Voice-Activated Technology, voice-assistance streamlines activities for HVAC technicians because they no longer need to look things up and attend to tasks.

Google Assistant on Android

Overview: Google Assistant on Android mobile devices provides HVAC professionals hands-free access to a plethora of data without actually interacting with the device (e.g., technical manuals and customer service records).

Impact on Work: This feature allows technicians to access information while they are still working, increasing efficiency with less downtime and lessening interruptions during the most vital minutes of service.

Integration Challenges: The main hurdle many businesses face while using voice-activated technology, such as Google Assistant, is making all technicians fluent in their jobs and working methods. Voice recognition accuracy can also be contingent upon the level of background noise present, with HVAC environments being susceptible to this type of noise.

Future Outlook: The development of AI (Artificial Intelligence) and machine learning will improve effectiveness in terms of speed and provide a better voice-activated assistant. Further advances could also include more user-friendly interfaces and integration with specific HVAC diagnostic tools, providing even greater efficiency in the field.

Amazon Alexa via Echo Buds

Overview: Amazon Alexa is now available on the go for technicians with Echo Buds, a wireless in-ear headset that lets you stream your favorite content, ask questions of Alexa's Voice Services to get information and insights, or check in with team members instantly during work.

Impact on Work: Echo Buds help sound technicians schedule jobs and user alerts and easily text/call customers in the field without pulling out their phones, making for a smarter, smoother task handling and customer interaction solution.

Efficiency Gains: An internal report by a national HVAC corporation examined the use of Echo Buds and found them to increase time management ability among technicians, upgrading daily scheduling pace by 10% just from improved hands-free communication alone.

Integration Challenges: Echo Buds work the best when paired with a stable internet connection, which might be limiting in some cases where connectivity is not so good. Also, the device must work seamlessly with their digital infrastructure

for maximum effectiveness.

Future Outlook: Over the long term, connectivity should be addressed as 5G and other network technologies mature, offering more reliable field applications for voice-activated devices. Moreover, they enable the seamless merging of these devices with IoT-enabled HVAC systems into a more complete process flow and diagnostics automation.

Part 4: Analytics in HVAC Operations for Efficiency

HVAC technicians act as their employers' eyes in the field. Performance and productivity data gleaned from an analysis tool can keep them efficient.

Toggl Track

Overview: Toggl Track is a time-tracking system that allows HVAC techs to track their work and see where they spend the most hours.

Impact on Work: By using this tool, a technician can quickly recognize time-centric tasks, which allows him to add more service calls by improving his job without sacrificing quality.

Efficiency Gains: A real-world example using an MEP company experienced a 13% increase in the productivity of the technicians after the Toggl track was implemented; it recognized inefficiencies and managed workloads more efficiently.

Integration Challenges: One primary challenge is that Technicians are used to working with conventional methods, so change is often resisted. Additionally, there are technical considerations for linking Toggl Track with your other business systems (CRM or ERP, for example), which may necessitate IT assistance.

Future Outlook: As AI and machine learning capabilities are refined, tools like Toggl Track will become more advanced over the coming years to provide predictive analytics that can identify how much work will come down the line and when it should be scheduled based on past activity.

RescueTime

Overview: RescueTime is versatile time-tracking software that runs in the background on devices to record daily activities and inform professionals about their focus levels during work hours.

Impact on Work: Rescue Time offers detailed reports that help techs learn how they work.

Efficiency Gains: In another case study, our HVAC technicians reduced their non-productive by over 30%, opening more time for technical work and customer interaction.

Integration Challenges: This issue needs to be tackled seriously, considering technicians' privacy concerns. Many



technicians feel uncomfortable with the median level of monitoring. Moreover, the tracking tools should also ensure data security and compliance with privacy laws.

Future Outlook: As efficiency tools such as RescueTime are integrated into larger business intelligence systems, we could see increased data of more complex layers for operation efficiencies. This should drive improvements in technician usage rates with additional data security and user-friendly interfaces.

Part 5: Apps for Learning and Development, HVAC Tech

Now, learning and development apps are revolutionizing how HVAC technicians can update their skills or gain more knowledge, making CEUs easier than ever.

HVAC School App

Overview: The HVAC School App is a comprehensive online resource dedicated to the heating, ventilation and air conditioning (HVAC) trade. Created by Bryan Orr, a figurehead in the HVAC community and a personal close friend of mine, this app lets you access tutorials, podcasts, quizzes and educational videos on all sorts of HVAC subjects that any level technician can use.

Impact on Work: This enables technicians to learn real-time challenges in HVAC systems while turning their downtime into productive learning periods by allowing access to valuable educational content right from the app.

Efficiency Gains: An HVAC company in the Midwest saw a 12% increase in efficiency with its field service technicians after it required them to continue using The HVAC School App regularly. The complexity of the technicians' issues was mitigated, and more time was spent troubleshooting and repairing.

Integration Challenges: Even though it proves to be effective, getting the app integrated into regular routines can be difficult, especially in organizations that have signed

contracts with entrenched corporate training methods. They must also make sure all technicians have the right number of surfable devices and megabytes.

Future Outlook: We can likely expect more immersive experiences with AR tutorials and VR simulations that simulate real-life situations for hands-on learning without risk or cost.

Interplay Learning SkillMill

Overview: Interplay Learning SkillMill is an interactive training platform with VR and 3D simulation that offers a rich learning experience, as it simulates real-world use cases for trades like HVAC.

Impact on Work: Interplay Learning allows technicians to train and sharpen their skills in a controlled, low-risk environment, which helps them perform well in any situation.

Efficiency Gains: Interplay Learning customers have seen a 35% increase in training completion rates and greatly reduced onboarding times for new technicians. In other words, Saas has an even faster ramp-up time than laas or Paas, which ultimately results in higher workforce efficiency and fewer training costs.

Integration Challenges: Initial investment cost, need for compatible hardware and some pushback from staff who are less comfortable using technological solutions. You need to update your training materials regularly with new content.

Future Outlook: As technology continues to develop rapidly, learning platforms such as Interplay Learning will likely offer more AI-enhanced personalized study plans that can create adaptive lessons based on how learners best absorb new information. This customization should enhance educational outcomes and tech functionality even further.

Conclusion

As we move toward the future, it is clear that HVAC is leaning more toward AI and automation. The tools mentioned are just the start of what could possibly be an industry norm and would extend a third helping hand to our HVAC technicians' capability. But despite the obstacles that need to be worked out, especially concerning integration and acceptance by professionals, there are undeniable advantages behind the technology: increased efficiency in operation (which can mean lower costs), higher accuracy of information retrieval and better final service quality.

The next frontiers of innovation and adaptation will be crucial in creating a unified, expansive umbrella for smarter service delivery capable of keeping up with the demands of non-contemporaries or environmental challenges.

These developments not only bring a considerable boost to the already existing operational qualities, but also raise the bar for what could be expected in the future of this industry.

About the Author

Tersh Blissett is a seasoned entrepreneur and a recognized leader in the HVAC industry. As the co-founder of Trade Automation Pros, Tersh has dedicated his career to integrating cutting-edge technologies such as AI and automation into small business operations, focusing on the skilled trades. His expertise extends to running Service Emperor, a comprehensive HVAC, plumbing and electrical service company based in Savannah, GA, which he founded to deliver exceptional service through innovative solutions.

A former TACP in the Air Force and an alumnus of Georgia Tech and the University of Arizona, Tersh combines his military discipline with his engineering and psychology academic background to lead his ventures toward growth and technological advancement. He is also the powerhouse behind the world's largest home services podcast, Service Business Mastery, which educates and inspires thousands of tradespeople around the globe.

Tersh's visionary approach to business and commitment to education in the trades make him a pivotal figure in revolutionizing industry standards through automation and advanced technology.

AI vs HUMAN

the future of csr

As a former home service owner-operator and entrepreneur, it's a fascinating time to experience the arrival of AI. After selling my home service business in 2019, I started Free2Grow. Originally, it was an "outsourced" CSR business that employed CSRs (Customer Service Representatives) to handle inbound calls, book appointments and schedule within a CRM for our home service clients. Just this past May, we made a complete pivot into the world of AI and won't be looking back. Since then, we've built a constantly improving and highly customizable AI Voice tool that is fully capable of doing almost everything our former CSRs used to: effectively answer calls, book within a CRM, place outbound calls and much more.

We get plenty of questions on the pros and cons of using AI Voice.

Here are the most frequently asked:

How will my clients react if they realize they are speaking with AI?

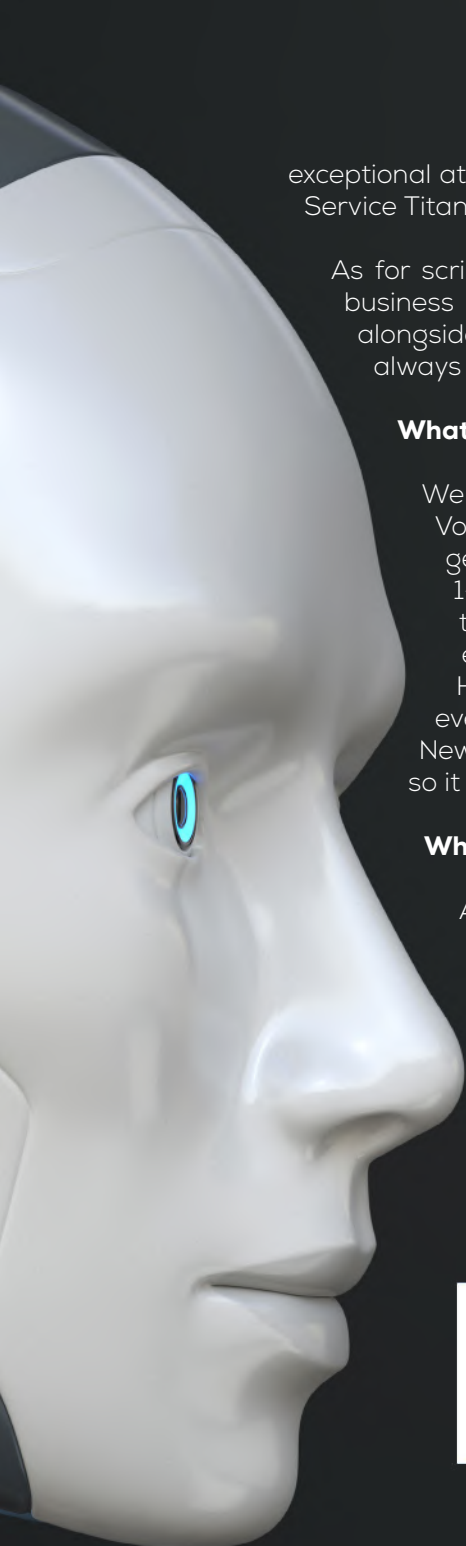
At the moment, more than 50% of clients or homeowners don't realize they're talking to AI. As the core AI Voice technology elevates, that number will likely increase. For those that do realize it's AI, the conversation primarily goes two ways. One, the client asks to speak with a human. In this case, the AI tool will generally offer to "book the call" or can transfer the call to the designated contact. Two, the client engages with the AI and participates in the call script or workflow.

It's worth noting that those asking to speak with a human likely don't understand how capable the AI tool is. The more calls that our AI voice tool handles, the smarter it gets and can respond to almost any relevant inquiry. It's also our belief that, over time, people will get more and more accustomed to engaging with AI on the phone and may even prefer it.

Can the AI Voice tool book calls within my CRM and use my preferred scripting?

Perhaps the most important dynamic of AI Voice is the capability of fielding a call - accurately capturing the customer data and inputting that information into a designated CRM. Human CSRs are certainly capable and expected to do this, but AI Voice has quickly caught on, becoming





exceptional at capturing client data and neatly putting it into a CRM. AI integrations with Field Pulse, Service Titan and others are becoming more common.

As for scripting, we believe that providing customized scripting and workflows is critical. Every business prefers to do things a little differently, so having an AI Voice partner that can work alongside you is critical. Scripting can be implemented exactly the way you want it and AI Voice always sticks to the script!

What is the best way for me to implement AI Voice?

We are currently onboarding close to one new client per day, with most of them using AI Voice initially for after-hours and overflow coverage. In our opinion, this is the best way to get familiar with the tool while it trains and develops. A successful onboarding should take 1-2 weeks in which you are building the AI Voice tool the way you want it and integrating it thoroughly. Training your AI can be a difficult process. Just like with a human, if you don't explicitly tell the AI what you want it to do and say, it can sometimes get things wrong. However, our onboarding process is led by a seasoned CSR who trains the AI. Lastly, even though formal onboarding can take 1-2 weeks, onboarding should never truly end. New data on what makes good calls and bad calls should consistently be provided to the AI so it learns. Doing this has helped us improve booking rates month-over-month.

What can you expect in the future from AI Voice?

As we've seen, AI Voice continues to evolve almost daily. As the core AI infrastructure for inbound calls improves, we fully expect that outbound AI Voice calling will become a main feature. Additionally, building customized options (inbound and outbound) will be important for any home service business. While most home service companies are not implementing AI Voice at the moment, we are expecting that a majority will be over the next 12-18 months. Its quality, consistency and ever-improving capabilities will be a driving force for growth and cost controls.



FREE² GROW

about the author

Charlie Felker is the CEO and Co-Founder of Free2Grow. Prior to Free2Grow, he owned/operated a multi-state home service business which he successfully sold in 2019. Charlie is a West Point graduate who served in the US Army from 2006-11 (82nd Airborne Division, 3rd Ranger Battalion).

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What is NAVAC?

NAVAC is the world's largest supplier of rotary vane vacuum pumps, the type used in HVAC/R applications, but they are also a heavy hitter in the HVAC/R tools market.

NAVAC launched its North American operations in Lyndhurst, NJ, in 2017, but the company has been involved in R&D and manufacturing of high-quality HVAC/R tools for over 25 years.

What products are they known for?

NAVAC's product portfolio comprises of vacuum pumps, recovery machines, manifold gauges, tubing tools, testing instruments, hose kits, and all the various accessories required to pull vacuums.

NAVAC has won many accolades for their products, including the ACHR News Dealer Design Award for their lightweight NP2DLM Cordless Vacuum Pump in 2019, the world's first DC inverter 4-cylinder recovery unit NRDC4M in 2020, the NTE11L Breakfree® Power Tubing Bender and the NEF6LM Breakfree® Power Flaring Tool in 2022, which also won the 2023 Innovation Award for its easy-to-use design and ability to make consistent, leak-tight flares, and the lightweight, A2L-compatible NR7 Recovery Unit in 2024.

NAVAC's latest product launch is the NEXUS Digital Manifold Gauge which includes wireless temperature clamps and a micron gauge all with their own screens. The manifold features four modes of operation (Manifold, Leak Test, Evacuation, and Decay Test) and is compatible with 72 types of refrigerants, including A2Ls.

lianna schwalenberg

**navigating innovation:
the story behind lintao lu and navac**

Who is NAVAC's president and how did they get into HVAC?

Lintao Lu has been the president of NAVAC since its North American inception in 2017. Affectionately known as "LT" by his team members, Lu is often sighted by coworkers as the first person in the office and the last one to leave.

When asked why he works so hard and enjoys spending so much time around HVAC people, Lu responds that, "HVAC is a staple, you must have it. You need to have good air conditioning, good heating, good air quality. In our sector of tools and instrumentation, we have a lot to bring to the innovation side. We teach best practices which we have proven to the industry. I always see it like finding purpose, that feeling of knowing you did something to advance the industry."

First entering the academic side of the heating and cooling industry, Lu considers himself lucky being able to move to France where he received his doctorate at the age of 26 in Energetic Physics. At that time, only the top 0.1% of Chinese students had the privilege to study abroad, sponsored by a joint program between the Chinese and French governments. While in France, he learned nuclear physics as well as how solar energy could be used to improve jet pump cooling systems.

Lu emigrated to the U.S. for post-doctorate research and to work as an engineer at Rheem's Global Air Headquarters and Manufacturing Plant in Fort Smith, Arkansas. Lu had six U.S. Patents in gas furnaces and advanced heat exchanger designs and is very proud of his contribution to Rheem's popular 90+ AFUE gas furnace at only 34' tall, which set the industry standard and is still selling in the market over 30 years later.

After 8 years at Rheem, though he discovered a refined taste for southern-style chicken, Lu felt the need for a job closer to his wife who had to relocate for her work. In this search, he landed



a job as the VP of Engineering at Fedders, a residential HVAC company known for brands such as Air Temp and Emerson Quiet Kool and had factories all over the world, including Singapore where Lu relocated for three years.

As the VP of Engineering, Lu had to step outside of his technical expertise to learn interpersonal and organizational skills to effectively manage and lead a diverse team.

The Fedders trademark underwent several ownership changes over the years, forcing Lu and many others into unemployment. After months of searching, Lu found home and appliance manufacturer Haier who was then just getting started in the U.S. market. There, Lu was thrown “back to square 1” as an engineer—but Lu recalls that this was the

starting point for his transition from engineering to product, marketing, and sales.

Lu’s proudest achievement during his 14 years at Haier was building the Haier brand from a nobody into a recognized leader in the home comfort industry. Through referral, Lu obtained his current position with NAVAC and emphatically admits how valuable and experiential it was to have this mostly uninterrupted career completely within the HVAC industry.

Though Lu will gladly talk for hours about jet pump cooling, nuclear energy, thermodynamics, and so much more, he ironically emphasizes that HVAC is “not rocket science,” in that he appreciates how there are endless possibilities both simple and complex to innovate in this industry.

What advice does President Lu have for building a strong and successful business?

Lu advises that to build a successful career not without, but in spite of, challenges, it is important to be self-reliant and resourceful, experiences many first-generation immigrants, like Lu, can profoundly relate to. He expands that, modestly reflecting on the ups and downs of his own career, "hardship will be character-building because if you take the time to look back at what you went through, you will have a sense of pride and you will be stronger because of it."

What does NAVAC do to support their distributors and the technicians?

Committed to technical innovation, vigorous research, and customer feedback, NAVAC takes a special interest in engaging technicians, distributors, and sales reps with solutions to the HVAC community's needs.

The company recently wrapped up their 2024 Annual Summit where an impressive array of sales reps, industry influencers, and key distributors explored the latest product innovations releasing next March and participated in hands-on training sessions.

Through a local NAVAC distributor, technicians can receive accredited training through My NAVAC University, a new initiative launched last year, dedicated to comprehensive education from NAVAC's national training team. The program has opportunities for technicians to earn NATE credits in recovery and evacuation, and A2L/Low-GWP certification.

What does NAVAC do to support the greater community?

NAVAC has partnered with the charity organization Miracle Mechanical, located in Georgia. A licensed HVAC and plumbing contractor, Brent Ridley and his wife Kathleen Ridley are dedicated to uplifting families and communities by providing much-needed plumbing and HVAC repairs at no cost to the recipient. NAVAC recently sponsored a complete HVAC system replacement for an elderly couple living in a mobile home in Silver City, GA, battling serious health conditions amidst extreme weather conditions.

To celebrate the achievements of highly skilled HVAC technicians and apprentices, NAVAC was an official sponsor of this year's 3rd Annual Service Titan HVAC National Championships, a premier national competition part of Service Titan's Elite Trades Championship Series, showcasing the talent and depth of expertise of tradespeople across the country. Through this sponsorship,

NAVAC seeks to inspire and support the next generation of skilled tradespeople in this essential trade.

How can technicians get introduced to NAVAC vacuum pumps or tools?

NAVAC vacuum pumps and tools are sold through distributors, including several authorized online distributors.

For a low-stakes entrance into the world of NAVAC, the Marketing Team at NAVAC recommends the NTC12 which is the 1-1/4-inch tubing cutter. With super-smooth ball bearings and an aluminum alloy body, it makes tube cutting experience easy and efficient. However, the tool that sells itself after a single demonstration is the cordless flaring tool, the NEF6LM.

Weighing less than three pounds, this flaring tool is capable of making over 100 flares on a single charge.

NAVAC is currently running their Full Throttle Tools Sweepstakes promotion, so there is no better time to look into NAVAC than right now! Purchasers of any NAVAC tool between August 1, 2024, and March 31, 2025, are eligible to enter a drawing for a Harley Davidson motorcycle. Terms and restrictions can be read on NAVAC's website.

FULL THROTTLE TOOLS

SWEEPSTAKES
FROM AUG 2024
TO MAR 2025

NAVAC
Empowering you to work smarter



BUY NAVAC TOOLS FOR A CHANCE TO WIN A MOTORCYCLE!

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For United States Residents ONLY. Additional Rules Apply.

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Liquid Cool V-twin Engine

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FROM
12/1
TO
12/31

DOUBLE ENTRIES

RAFFLE.NAVACGLOBAL.COM

use your voice.

"The tongue can paint what the eyes can't see"
ancient Chinese proverb

If you've been reading my column over the last few issues, you know I place a lot of value on **The Voice of the Contractor**. This can mean a variety of things depending on who you ask, but translated from corporate blathering, it just means I care about the thoughts and opinions of the professionals who handle and install my stuff.

I specifically seek out and am personally interested in not only how end-users interact with my products, but also the general sentiment felt around my company and brand overall.

Though my day job is at a plastics manufacturer, much of this is applicable up and down the entire value chain. Wholesale distributors, inspectors, architects, other contractors working on the project, manufacturer's reps – any number of people might be involved at one time or another.

For us, scouring social media for comments and questions, paying very close attention to the website's email reply form that often receives general inquiries and especially, talking to actual human beings at tradeshow, distributors' counters, in the DMs, etc. – these are important exchanges that can help shape critical product improvements, prioritize our projects as a company, alter certain policies, etc.

We always want to know what you think!

There are a lot of examples of bigtime influencers using their public position to shill products or even advocate for certain things. It's somewhat easier and more natural for someone with a large following to speak their

mind – they have built a platform where their opinion, perceptibly, carries a bit further than the average joe.

This should not discourage anyone from sharing valid concerns, asking questions, providing insightful commentary or even just saying hello to introduce yourself.

If manufacturers' heads are in the clouds, and their collective ears are not to the ground – there is a certainty that crucial nuggets of import will slip through the cracks, and so with it goes whatever opportunity is held within.

I'm not an engineer, nor an installer. To be frank, I am basically completely untechnical when it comes to the mechanical room. But, when a product inquiry comes to my desk and I have literally no idea how to find the answer – my approach is to reach out to the person who can find the answer, learn, and then communicate that back. In some cases, it may even make sense to connect the initial asker with, perhaps, the product manager or a design engineer, etc.

Ultimately, if you're being left on read, or your emails are not receiving any sort of reply – it might be time to find another manufacturer more attuned to the way business works in 2024. As always, communication is central to productivity – this is no different than virtually any other time.

The key difference: nowadays, communications should be incredibly easy.

Everybody has a multiplatform messaging device in their pocket; at most, it takes a few minutes to find some way to get in touch and send an email.

Fire one off and get the answer you need.



Whether you get in touch via LinkedIn messages, emailing contacts at the company or even calling customer service – getting an answer to a question should be quick, painless, effective, easily repeated and pleasant.

Most of the hypothetical communication examples above center around a bit of an issue. Installation problems, questions, confusion – a lot of communication hinges on getting problems sorted out – but positive feedback is always incredibly welcomed too.

If something worked out, if a response was prompt and professional – let us know that as well. Generally, we’re all out here trying our best, but **\$#@% happens** to every one of us every single day – acknowledging that little support goes a long way and helps establish a stronger partner relationship.

Your voice can help bridge the gap between innovation and practical application. It can help shape and evolve the entire industry. It can solidify and foster both a collaborative partnership but also a solid, trusted bond between parties.

I want to state this again, in strong terms: whoever is reading this, it’s your voice that matters. You don’t have to be the darling of Instagram to make your presence felt – we want to hear from you.



Matthew Pryce

Marketing & Communications Manager for Centrotherm Eco Systems in New York. Matthew is a frequent contributor to various HVAC publications and one of the editors of this one!

What other little spare time he’s got is spent traveling with his wife Gabrielle and mastering new and exotic instruments.

@matthewfuntime



building hvac science TruTechTools:

Jennifer Manzo

@hvacchicksjennifer

Misfits of HVAC Podcast



INSIDE the HVAC/r PODCAST CIRCUIT

Few people in our industry have sparked my interest quite the way Bill Spohn of TruTechTools.com has! Maybe it's the genetic connection (we'll get into that later) or the fact that his mind is such an obviously luminous place, filled with knowledge, and scientific secrets but also playfulness and adventure! I mean, who else would take the time to answer my interview questions while on literal safari in Kenya! Now, Africa isn't the only journey Bill has been on, living a life of learning how to commit the impossible and collide two worlds together to make one, giant industry filled with technicians performing #BetterHVAC.

It's truly an honor to be one to offer pieces of that journey to all of you.

Bill's career in the trades began at Fischer Scientific in Indiana, PA where he built lab equipment and testing instruments. When that job ended in a layoff and unemployment began to bore him, Bill took a valiant leap and applied for a position at Bacharach as a design engineer for combustion

and environmental test instruments group. It was in this position that Bill was introduced officially to the beautiful and chaotic world of HVAC, and learned a lot about the wide ranges of hvac testing and made a ton of connections at trade shows and conferences.

Through these events over the course of a decade with Bacharach, and a brief stint running the business unit at Superior Valve, Bill had garnered the courage and expertise to approach Testo for a job! Over the course of the next decade, the Bill Spohn we all know and love today was forged, teaming with Jim Bergmann on many projects they connected over their shared passion for better test methods and tools and the education needed to invent them. All of these endeavors bring us to 2007 when Jim and his dad opened TruTechTools with Bill proudly at their side. Two years later Bill decided to jump on full

time with the Bergmann's, and in 2014 he and his business partner, Eric Preston bought the company outright beginning the most recent phase of Bill's incredible journey: becoming 100% owner after buying Eric out in October of this year!

Ok, we all know Mr. Spohn has led a live to make us all swoon, but what does that have to do with the podcast circuit? Oh, don't worry. Bill's not done yet!

See, Bill is no stranger to the podcast community. In 2017, after Bryan Orr told him "You have a great voice for explaining things, and some unique experiences to share" Bill decided to put it to use, starting his first podcast in 2017 as part of the Blue Collar Roots podcast circuit. Less than a year later he was approached by RESNET to host their podcast and began to juggle both, a task he still handles with grace today.

The Building HVAC Science Podcast is an amazing 'meeting of the minds' style show. Eric Keiser and Bill meet with guests and share info on best practices for implementing building science in HVAC. When asked why this show is so important to our industry and why he cares so much about grouping both trades together, this was his response:

"One of HVAC's biggest tasks is space conditioning. You need to know about the space and where that space is located in order to design a system that will operate effectively and efficiently in that space. If you don't understand the impact of the building and it's environment the end result is usually some kind of waste: waste of time trying to band aid solutions, waste of money -yours or your customer's or both, waste of energy, and worst of all waste of your reputation as a company and employer once customers or employees find out a better way from someone else!"

Bill is one of the few public figures to truly put his money where his mouth is, and by that I'm referring to "Spohn Home", Bill's 100% sustainable, 0 carbon footprint home that he

lives in every day. From solar power, to electric vehicles, the Spohns have managed to reduce their negative impact on the environment to practically nothing, while setting an example for all of his followers and employees by following through in a way that we were all allowed to watch through the Spohn Home facebook group!

Having been a guest on this amazing show, I can truly say that it's completely unique from all other shows in our circuit. Bill and Eric's wisdom and playfulness shine as they dig deep into the envelope of the home and capability of the system as technological and industrial advancements are not only celebrated, but dissected in a way that leaves contractors who listen craving more.

Bill's very Zen, laid back approach is a testament to the fact that he holds other interests outside HVAC/BS like tracing his family's heritage (even finding that Bill and I are long lost cousins by blood and reuniting another cousin with his birth family) and his use of a phone app to teach himself electric guitar! Listeners get the privilege of following these hobbies as well as TruTech's professional climb on the show creating a listener and host bond unlike any show I've seen to date.

Want to learn more about Bill, his podcast and TruTechTools? Follow Building HVAC Science on all podcast platforms and check out [TruTechTools.com](https://www.trutechtools.com) for incredible deals on the tools you love, the brands you know, and support the people who make a real difference in this industry every single day!

Don't miss out on following Bill's house adventures in the Spohn Home facebook group and if you're looking for a one on one mentor with Bill's expertise, sign up for the HVA-Chicks Coalition mentor program at [HVAChicks.com](https://www.HVAChicks.com), you might just get Bill himself, as we are another amazing cause he donates his valuable time to!

UNDERSTANDING *A2L Refrigerants*



In December 2020, congress passed the American Innovation and Manufacturing (AIM) Act, and in 2021 the EPA introduced a rule mandating an 85% nationwide phasedown in high-global warming potential (GWP) hydrofluorocarbon (HFC) refrigerants by 2036. This phasedown will be accomplished in three ways:

1. Phasing down production and consumption
2. Maximizing reclamation and minimizing releases from equipment
3. Facilitating the transition to next-generation technologies and low-GWP refrigerants through sector-based restrictions. Many of these lower-GWP refrigerants are considered mildly flammable. The American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) has a standard 34 designation of A2L.

The transition to next-generation refrigerant technologies is being aided by the Environmental Protection Agency's (EPA) Significant New Alternatives Policy program (SNAP), which approves the use of low-GWP refrigerant for specific uses. Many A2L refrigerants have already been approved by the EPA with many more approvals in the works.

The goal of this article is to provide information on refrigerant classifications, the differences between refrigerants and the influences driving the shift away from traditional refrigerants to A2L refrigerants.

Refrigerant Classification

The ASHRAE Standard 34 classification table is designed to categorize refrigerants according to two primary factors: flammability and toxicity. Regarding flammability, refrigerants are tested and categorized by several factors including how much refrigerant per unit volume of air will support combustion, the amount of energy

needed to initiate combustion, the amount of energy released from combustion and the rate of combustion propagation. Toxicity designated as A or B is defined by the occupational exposure limit (OEL). Lower toxicity refrigerants (A) have an OEL of ≥ 400 ppm while higher toxicity refrigerants (B) have an OEL of <400 ppm).

		SAFETY GROUP	
INCREASING FLAMMABILITY	High Flammability	A3	B3
	Flammable	A2	B2
	Low Flammability	A2L	B2L
	No Flame Propagation	A1	B1
		Low Toxicity	High Toxicity
		INCREASING TOXICITY	

To give you an example of the classification table use, the following describes various refrigerants and their classifications:

Class A	Class B
A3 refrigerants such as R-290 propane have a higher flammability and a lower toxicity.	At present, there are no known B3 refrigerants.
A2 refrigerants such as R141B and R-406A are flammable and have a lower toxicity.	B2 classified refrigerants such as R-30 and R-40 are flammable and have a higher toxicity.
A2L classified refrigerants such as R32, R-454B, and R-1234yf have a lower flammability than A2 and lower toxicity.	B2L classified refrigerants such as R-717 ammonia have lower flammability and higher toxicity.
A1 classified refrigerants such as HFC R-407C have no flame propagation and low toxicity.	B1 classified refrigerants such as R-10, R-21, and the rather obscure R-764 sulfur dioxide have no flame propagation but higher toxicity.

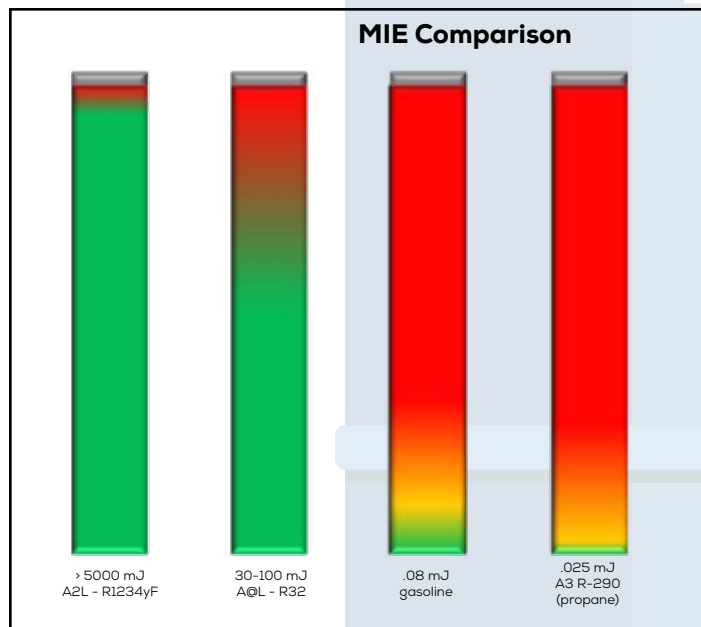
Flammability

Since A2L refrigerants are mildly flammable it is important to understand the characteristics of flammability and how they are affected by the HVAC environment. There are three important factors when understanding flammability.

- **Lower Flammability Limit (LFL):** The concentration in air necessary to generate a flammable mixture.
- **Minimum Ignition Energy (MIE):** The lowest energy required to ignite the flammable material in air or oxygen found at a certain optimum (stoichiometric) mixture.
- **Heat of combustion (HOC):** The amount of energy that is obtained from the burning of a volume of gas is measured in Btu.

LFL – Lower Flammability Limit

Mildly flammable A2Ls consist of HFCs, hydrofluoroolefins (HFOs), and also blends of these two synthetic refrigerants which have a high LFL, often eight times higher than A3 refrigerants such as R-290 Propane. This means that a much larger concentration of A2L must be present to form flammable concentrations. This is important when considering refrigerant leakage especially in enclosed spaces. While a very low amount of A3 refrigerant or a low amount of A2 refrigerant in an enclosed space can be very dangerous, A2L refrigerants require a much larger amount



of gas leakage to reach sufficient concentrations necessary for ignition.

MIE – Minimum Ignition Energy

A2L refrigerants have a significantly higher MIE which means it is harder to ignite than A3 refrigerants. Hydrocarbon vapors such as propane (R-290) can be easily ignited by many energy sources, even sometimes by the lower levels

produced by static electricity.⁵ This can be orders of magnitude lower than the levels required to ignite the A2L refrigerants. Even gasoline has a much lower MIE than A2L refrigerants by almost a factor of 10!

HOC – Heat of combustion

HOC is the amount of energy released during combustion. The units of measure for HOC are expressed either in kilojoules per gram (kJ/g) or Btu/lb. Simply stated, you can think of HOC as the violent reaction when a gas ignites.

A3 refrigerants like Propane have a very high HOC on the order of 19,905 Btu/lb., whereas A2 and A2L have much lower values on the order of 2700-4400 Btu/lb. This means that while A2 and A2L refrigerants can, under the right circumstances, burn with veracity, they are generally not in the category of explosion hazard like you would find in A3 refrigerants.

What you may find interesting is that the HOC for an A1 refrigerant like R-410A is 2,800 Btu/lb. and a nominal A2L refrigerant such as R-32 has a HOC is 3,869 Btu/lb. Given a typical residential ducted split unit charge being ~ 15 lbs., there is essentially only about 24,000 Btu difference between the A2L and R-410A. This difference is equivalent in relative comparison to burning 3.4 lbs. of dry wood (about 2.5 feet of dry 2 x 4) versus burning 1.7 lbs. Duraflame™ wax fire log (about 38% of a single log.)^{3,9}

Flammability Summary

You can summarize refrigerant flammability into the ease of ignition, expansion or propagation of the flame and the amount of energy release.⁹

- Class 1 refrigerants have no propagation at 60°C but may still be flammable at higher temperatures.
- Class 2L refrigerants are “mildly flammable”, difficult to ignite with a relatively low energy release and low flame propagation speed.
- Class 2 refrigerants ignite easily with a relatively high energy release.
- Class 3 refrigerants ignite very easily and are potentially explosive.

Compared to A1 refrigerants, A2Ls have slightly higher flammability properties, and if burned, produce similar types and amounts of by-products (e.g. HF) and somewhat higher heat of combustion/fuel value. Flammability risks from A2L refrigerants will be mitigated by a variety of equipment design changes, applicable codes and standards and technician training.



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The lower flammability limit of A2L refrigerants is very high, which means that a high concentration of refrigerant is needed to create a flammable mixture (ASHRAE 34). 9, 10

So How Does This Affect Me?

The move to A2L refrigerants is happening now. Most states have passed legislation to allow the use of the more flammable, low GWP A2Ls for air conditioning only or air conditioning and refrigeration.

Since each state handles the code-making process differently, it is important to understand your local building codes for A2L allowance.

Except for a few like Illinois and Texas, most states have a statewide code process. For states without codes, legislation needs to pass guaranteeing the acceptance of A2L refrigerants approved by U.S. EPA SNAP throughout the state.

Please refer to your state and local building codes for specific information on your situation.

The shift to more flammable refrigerants will require the appropriate equipment for installation and servicing. It is critical to make sure your test equipment is compatible with A2L refrigerants. At Fieldpiece, we have the products you will need to safely navigate this transition.

Article courtesy of FieldPiece instruments.

<http://fieldpiece.com/news-articles/understanding-a2l-refrigerants>



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lianna schwalenberg how a minisplit works

Fundamentals from SD's Favorite Minisplit Specialist, @missminisplit



As an HVAC technician in northeast Ohio, I work on mini-splits pretty often in both residential and commercial settings. Great for situations that don't have ductwork and an increasingly popular alternative to gas, heat pump mini-splits are everywhere! This year, I had an unusually large amount of calls regarding water leaks, and all of them (save for a failed condensate pump and another for lack of maintenance), were completely preventable at installation. I believe that everyone, installers and service techs alike, should know how minis work. While they share similarities to mini-splits, they are quite different.

To better understand the basic design aspects, as well as a few tips and tricks, I sat down with Rachel Samala, a.k.a. @MissMinisplit. She is the owner of a mechanical HVAC company in San Diego, and has nearly a decade of experience in mini-split installation and service. Together, we created a list that explains and simplifies the mini-split, and hopefully give our fellow techs and installers a leg-up on their next service call.

All the motors can ramp up and down.

When opening up a mini-split, techs may be surprised that there's not much to see – just a control board and sensors everywhere. This is because the compressor and both fans are inverter-driven motors, meaning they use DC voltage to change speeds. On how inverters work, Samala explained, "AC line voltage reaches a rectifier which changes the voltage to DC. That DC voltage then goes through what is essentially a switch,

the IGBT (insulated gate bi-polar transistor). The IGBT then feeds the compressor motor DC voltage in a way that mimics AC, thus creating the inverter action. This is what allows the compressor to soft-start and slowly ramp up and down." Easy enough, right? The inverter compressor is fundamental to the system's operation, which we'll see as we continue down the list.

Mini-split vs. Multi-split vs. VRF

VRF (variable refrigerant flow) is a broad term that refers to any system with an inverter compressor. Samala says that it can be a heat pump, straight cool, mini-split, central system and "if it has an inverter compressor, it's a VRF." So, by definition, all mini-splits are VRFs. Mini-split systems that are larger than five tons with more advanced bells and whistles are usually what people think of when they hear VRF, and some people mistakenly think all VRF systems can heat and cool at the same time. Samala breaks it down:

If it's a VRF multi-zone mini-split heat pump, then it can either heat all the zones or cool all the zones, but it can't heat one zone while cooling another zone.

Only VRF systems that specifically have heat recovery (also known as a three-pipe system) have the ability to heat and cool at the same time.

When a mini-split system has two or more indoor units connected to one outdoor unit, it can be referred to as multi-splits or multi-zoned, and techs will notice the outdoor unit has many sets of pipes connected to it. However, this is not to say the visual two-pipes are a hard-and-fast rule. If the outdoor unit only has two pipes but is connected to a branch control box inside, the system can have multiple heads. As aforementioned, if there are three pipes connected to the outdoor unit, that's your sign the system has heat recovery. However, other manufacturers, like Mitsubishi, have a two-pipe system that can simultaneously heat and cool.

"Critical charge."

Most manufacturers classify their mini-splits as "critical charge," meaning the only approved method for charging these units is by weight, which

differs from methods such as superheat, subcooling or clear sight glass. The units arrive factory-charged, and manufacturers will specify how much refrigerant to add above a certain length of lineset. It's always recommended to check the installation manual for this, as well as pay attention to the minimum required lineset length.

The expansion valve is outside.

With these systems, the expansion valve is located in the outdoor unit. There are some logical reasons for this decision, such as noise and limited space. However, because the evaporator is so small, mounting the valve directly onto the coil has the potential to flood the evaporator more quickly. This is why it's important to pay attention to the minimum required lineset length. As a consequence of the metering device being outside, both lines are low pressure in cooling and high pressure in heating. When charging a unit during winter, it helps to pump the refrigerant into the high side using a recovery machine.

Superheat is normally low.

Sometimes mini-splits only have one service port, typically on the suction side, and it may be tempting to measure superheat. While this can be done, it's important to remember that these units tend to run on very low superheat, usually 0-5°F. These systems are designed this way to maximize the efficiency of the small evaporator size, allowing more saturated refrigerant to fill the coil and absorb the heat load. The outdoor unit typically has at least one accumulator mounted on the suction side to protect the compressor from flooding.

Condensation management prevents water damage.

Both refrigerant lines should be insulated with foam to prevent condensation. If the insulation is not wrapped tight and touching the lines, moisture will build up inside the insulation and drip everywhere. Linesets that run behind the unit and through places where the lines are colder than dew point are especially critical to wrap. The drain piping should be pitched, but if this is not possible, a condensate pump must be installed. I personally recommend that, while you're up there cleaning the filter, you flush the drain pan with water or clean out the screen in the pump reservoir to ensure no dust or debris clog up the flow. The head units that leak are usually

over family heirlooms and electrical wiring, so we all have to be better about keeping the drains clear and be sure the condensation flows away from the unit.

Defrost control during heat mode.

Unlike a single-speed heat pump, an inverter mini-split is capable of staying in heat longer, switching into defrost mode less frequently. This is accomplished by modulating the compressor and condenser fan and using more temperature sensors to make better decisions. Frost occurs when humidity in the air condenses on the lines and fins when the condenser coil temperature is below 32°F. In defrost mode, the outdoor fan will shut off and the reversing valve will change to allow hot gas refrigerant to enter the condenser coil until a certain amount of time has passed and certain sensors are satisfied. Mini-splits typically have an electric base pan heater to make sure the melted water drips out of the unit. Most indoor units are operated by wired or remote controllers.

Mini-split indoor units do not use the RGYW terminals, with which techs are most familiar. When asked why this is the case, Samala said, "using standard thermostat wire and thermostats on inverters defeats the purpose of having an inverter system, because inverters use DC voltage, which requires specific wiring and controllers." If the system is controlled by a wired controller, it typically requires shielded 18/2 wire between the indoor head and the controller. If it is controlled wirelessly, a remote controller sends an infrared signal to a receiver at the indoor unit which converts the light data into electrical signals. Because of this, techs can usually replace remotes without needing to program any data.

Flares are the most common leak point.

The common leak culprits are the flare connections, either because the installers did not tighten them to specifications or leak-test them, or the factory-flare of the lineset was botched. Many experienced installers, like Samala, recommend cutting out the factory flare on the lineset and making a new one, as well as using a thread sealant to protect against leaks.

Leak-stop and dye are not recommended.

Just like any other system, the same principles of leak searching apply to mini-splits. If there is some refrigerant in the system, begin with an electronic leak detector and add nitrogen if needed.

Then, pressurize and use soap bubbles. Change Schrader valves and hose gaskets, and apply thread sealant to gauges as necessary.

Most mini-split leaks can be found and repaired without the use of dye or leak-stop. There are many wrong ways to add dye to a system, and some compressor manufacturers have not researched the effects of dye and leak-stop to properly approve or disapprove their uses.





acupuncture: understanding the ancient practice

Acupuncture is a traditional Chinese medicine (TCM) practice that involves the insertion of thin needles into specific points of the body known as acupuncture points or acupoints.

There are over 360 points in the body with 12 main meridians (pathways). Unlike western medicine that has only been around for a couple hundred years, this practice has been used for thousands of years to promote healing, alleviate pain and restore balance within the body.

Our Acupuncture is based on the concept of “Qi” (pronounced “chee”), which is believed to be the vital life force that flows through meridians. When the flow of Qi is disrupted or blocked, it can lead to illness and pain. Acupuncture aims to restore this balance by stimulating the body’s natural healing processes.

promoting healing by delivering oxygen and nutrients while removing waste products.

3. *Balancing the Body’s Energy: Acupuncture helps to balance the flow of Qi, addressing blockages that may lead to physical and emotional issues. By restoring this balance, the body’s self-healing mechanisms are activated.*
4. *Modulating Pain: Acupuncture has been shown to influence the body’s pain pathways by affecting the release of endorphins and other pain-relieving substances. This is why many people seek acupuncture for chronic pain conditions.*

Debunking Common Myths about Acupuncture

Despite its long history and growing acceptance in the Western medical community, several myths about acupuncture persist. Here are some common misconceptions and the truths behind them:

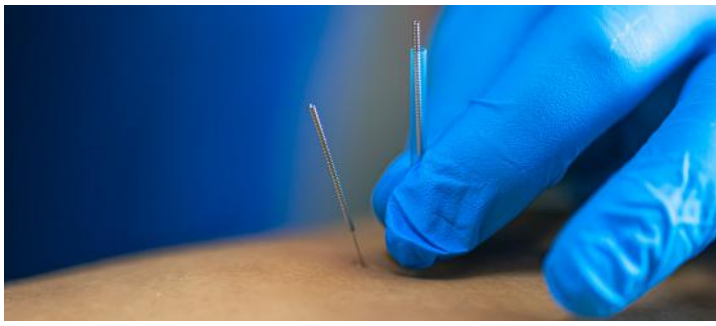


How Does Acupuncture Work?

Acupuncture works through several mechanisms:

1. *Stimulating the Nervous System: When needles are inserted into the skin, they stimulate nerve endings, which can trigger the release of neurotransmitters and hormones. This can lead to a reduction in pain and an increase in feelings of well-being.*
2. *Increasing Blood Flow: The insertion of needles can enhance circulation in the area,*

Myth: Acupuncture is Painful: Many people fear that acupuncture will hurt due to the use of needles. However, acupuncture needles are extremely thin (about the size of a human hair) and are often inserted painlessly. Most patients report feeling little to no discomfort, and some even describe a sensation of relaxation or heaviness at the insertion points.



Myth: Acupuncture is Only for Pain Relief: While acupuncture is widely known for its effectiveness in managing pain, it can also address a variety of conditions, including digestive disorders, anxiety, insomnia, and even infertility. Its holistic approach treats not just symptoms but the whole person.

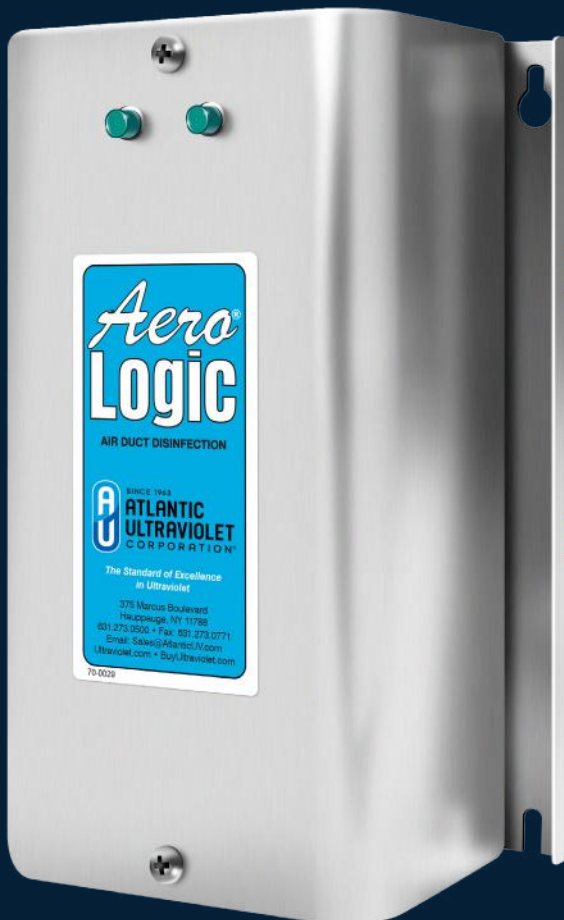
Myth: Acupuncture is a Placebo Effect: While belief in the treatment can influence outcomes, numerous studies have demonstrated that acupuncture produces measurable physiological effects on the body. Research provides evidence of its effectiveness beyond placebo, indicating changes in brain activity, immune function and hormone levels,

Myth: Acupuncture Has No Scientific Basis: There is a growing body of research supporting acupuncture's efficacy for various conditions. Organizations like the World Health Organization (WHO) recognize acupuncture as a valid treatment for several health issues.

Acupuncture is a valuable therapeutic practice that has been embraced by many cultures around the world for its holistic approach to health and wellness.

By understanding how acupuncture works and dispelling common myths, individuals can make informed decisions about incorporating this ancient practice into their healthcare regimen. Whether for pain relief, stress management or overall health enhancement, acupuncture offers a unique pathway to balance and well-being.

Many are discovering the benefits of this holistic approach to healing, making acupuncture a valuable option in the realm of complementary and alternative medicine.



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ServiceTitan

ELITE TRADES CHAMPIONSHIP SERIES



📺 CBS SPORTS NETWORK

Note: all times are EST

December 13

- 7 PM ServiceTitan HVAC National Championship
- 8 PM Plumbing National Championship

December 20

- 8 PM IDEAL Electrician National Championship

December 27

- 8 PM U.S. Auto Tech National Championship Driven by Yokohama



Congratulations to the 2024 Champions

Competition	Class	1 st place	2 nd place	3 rd place
IDEAL Electrician National Championship	PRO	Tom Kennedy (Big Bend, WI)	NA	NA
	APPRENTICE	Nick Chovan (New Albany, OH)	Kyle Bath (Kewaskum, WI)	Jeremy Myers (Bethlehem, PA)
ServiceTitan HVAC National Championship	PRO	Craig Childress (Peabody, MA)	Patrick Boldt (Leipsic, OH)	Curtis Harrington (Egg Harbor City, NJ)
	APPRENTICE	Dustin Hawkins (Shelbyville, IL)	Cameron Raab (Brighton, CO)	Billy Dahmen (Niles, MI)
U.S. Auto Tech National Championship Driven by Yokohama	PRO	Andy Buehler (Sidney, OH)	David Borer (New Reigel, OH)	Daniel Fuller (Southbury, CT)
	STUDENT	Randy Giroux (Lima, OH)	Andrew Gonyou (Lake Odessa, MI)	Jake Moog (Evansville, IN)
Plumbing National Championship	PRO	Craig Childress (Peabody, MA)	Michael Seidel (Altoona, PA)	Tyler Edelman (Bastrop, TX)

The ServiceTitan Elite Trades Championship Series (SETCS), will be broadcast on CBS Sports on Fridays in December, highlighting the skills and craftsmanship of the nation's top tradespeople. This year's championship finals featured intense competitions across the electrical, HVAC, automotive and plumbing trades.

With a spotlight on both professionals and students/apprentices, the broadcast series will highlight the importance of critical trades and underscores the importance of nurturing new talent in these imperative fields.

"The skilled trades are the backbone of our communities, providing essential expertise and dedication to the work that keeps our world running," said Scott Goldman, Senior Director of Content Marketing at ServiceTitan. "We are proud to use this platform to showcase the remarkable talent of these professionals, celebrating their hard work, craftsmanship, and the vital contributions they make every day."

In 2024, competitors across all categories vied for a share of a \$250,000 prize pool in cash and sponsor-provided awards. These skilled professionals earned their spot in the finals through a series of rigorous qualifying events held over several months. The competition culminated in intense head-to-head matchups within a custom-built arena, designed to both challenge their expertise and celebrate their essential contributions to the trades.

Congratulations to the 2024 champions crowned at the West Palm Beach Convention Center, including standout competitor Craig Childress, who achieved remarkable success by winning titles in both HVAC and plumbing for the second consecutive year.

"I don't think it has fully sunk in yet. This has been an incredible experience," said Childress after securing multiple titles for the second consecutive year. "Being the first to win two competitions back-to-back is a huge accomplishment. It means a lot to me, and

I'm passionate about inspiring future generations in the trades."



About ServiceTitan Elite Trades Championship Series:

The ServiceTitan Elite Trades Championship Series (SETCS) was founded in 2016 with a clear mission: to raise awareness and support for the growing shortage of skilled trade workers across the nation. Over time, it has evolved into a premier championship platform dedicated to promoting the trades and celebrating the highly skilled professionals who have long been underappreciated. Through large-scale competitions, SETCS shines a spotlight on these individuals. Sponsored by ServiceTitan, the platform hosts national championships for both professionals and apprentices in the auto tech, electrical, HVAC, and plumbing industries. More information is available at elitetrades.global and by following on LinkedIn and Facebook.

In 2018, an idea was brought to life.

An idea that HVAC guys who were passionate about their craft could wear cool gear that represented what they did for a living.

An idea that the brand itself would stand for something more than just a cool looking shirt or hat.

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It celebrates those who have the desire to learn and have made the conscious decision to strive to be the best at what they do.

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