

TECHNICIAN CERTIFICATION FOR THE HVACR INDUSTRY | NOV. 2021

# NATE

M A G A Z I N E

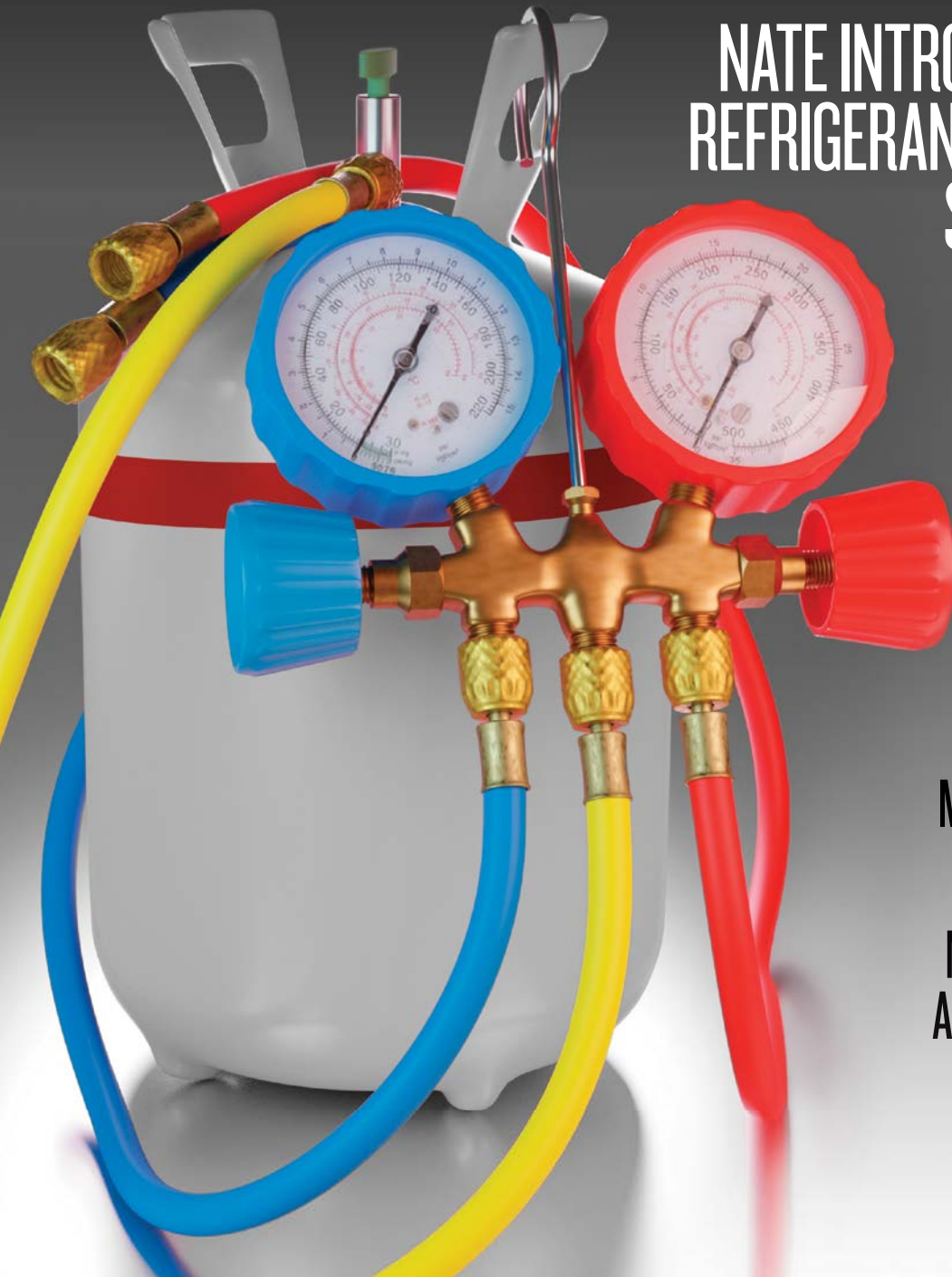
NATE INTRODUCES NEW  
REFRIGERANT EXAM AND  
STUDY GUIDE

**ALSO:**

AHRI'S  
REFRIGERANT  
WEBINARS

ADVANCED AIR &  
METAL EMBRACES  
EDUCATION

MANUFACTURERS  
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REGULATIONS



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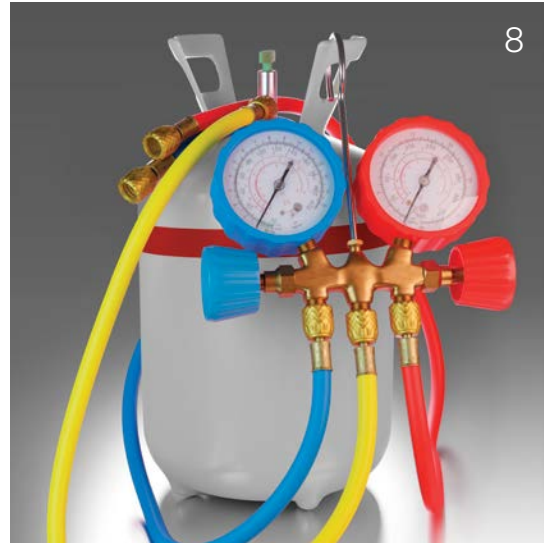
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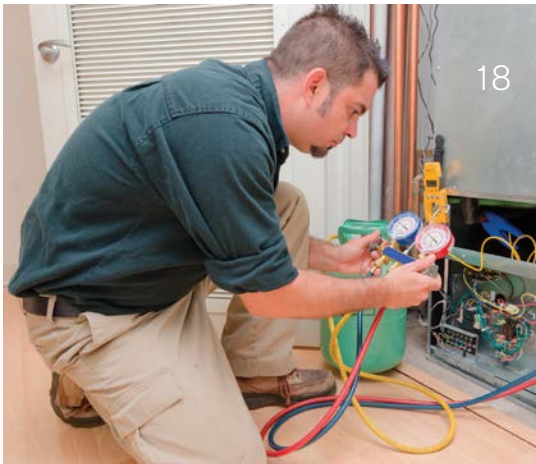
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# NATE's New Exam Prepares Techs to Handle GWP Refrigerants



The new state and federal regulations phasing down the use of hydrofluorocarbons (HFCs) in air-conditioning and refrigeration equipment mean a lot of changes in our industry. Our transition to new low-global-warming-potential (GWP) refrigerants brings with it a new set of challenges and opportunities across the industry. At NATE, we recognize one of the most important steps to take is to make sure HVACR technicians know how to properly and safely handle GWP refrigerants. These products are more advanced and have

different properties, so it is vital that technicians have the necessary skills and job knowledge to handle them safely.

That is why we are proud to announce the launch of a new refrigerant exam. The new NATE refrigerant exam is designed to ensure that HVACR engineers and technicians know how to safely and efficiently use low-GWP refrigerants. The exam covers all aspects of a technician using refrigerants, including the proper handling, transportation, charging, evacuation, and reclamation of refrigerants.

In this issue, you will learn more about how we developed the exam. We worked closely with subject matter experts on our Technical Committee to develop the knowledge areas of technician expertise (KATEs) and design test questions. You will find our interviews with Technical Committee member Jeff Warther, The Chemours Company, and NATE's Director of Testing and Education Anthony Spagnoli on their work and collaboration on the exam development.

It's also important to us to help prepare technicians for the exam and give them the tools they need to be successful. That is why we are introducing a new study guide alongside the exam, *Low GWP Refrigerants: The Industry's Refrigerant Certification*. In this issue, you will find our conversation with Robin Gault-Winton, Scantron Corporation, on how we developed the framework, domains, and language for the study guides.

NATE is not alone in helping to prepare the industry for the refrigerants transition. In this issue, you will read more about how Carrier is preparing technicians for the new regulations through changes to its technician training and support. We also interviewed the AHRI staff behind their Refrigerant Webinar Series. You will read more from Helen Walter-Terrinoni on how the webinar series gave AHRI the opportunity to talk with industry professionals about alternative refrigerants and help them better understand the new refrigerant standards.

As our industry evolves, NATE will continue to set the standards for quality HVACR technicians. We are excited for this step forward to better support the needs of our community. I believe that knowledgeable technicians are key to the growth of our industry, and I am proud to be a part of this next chapter—and look forward to what lies ahead. ●



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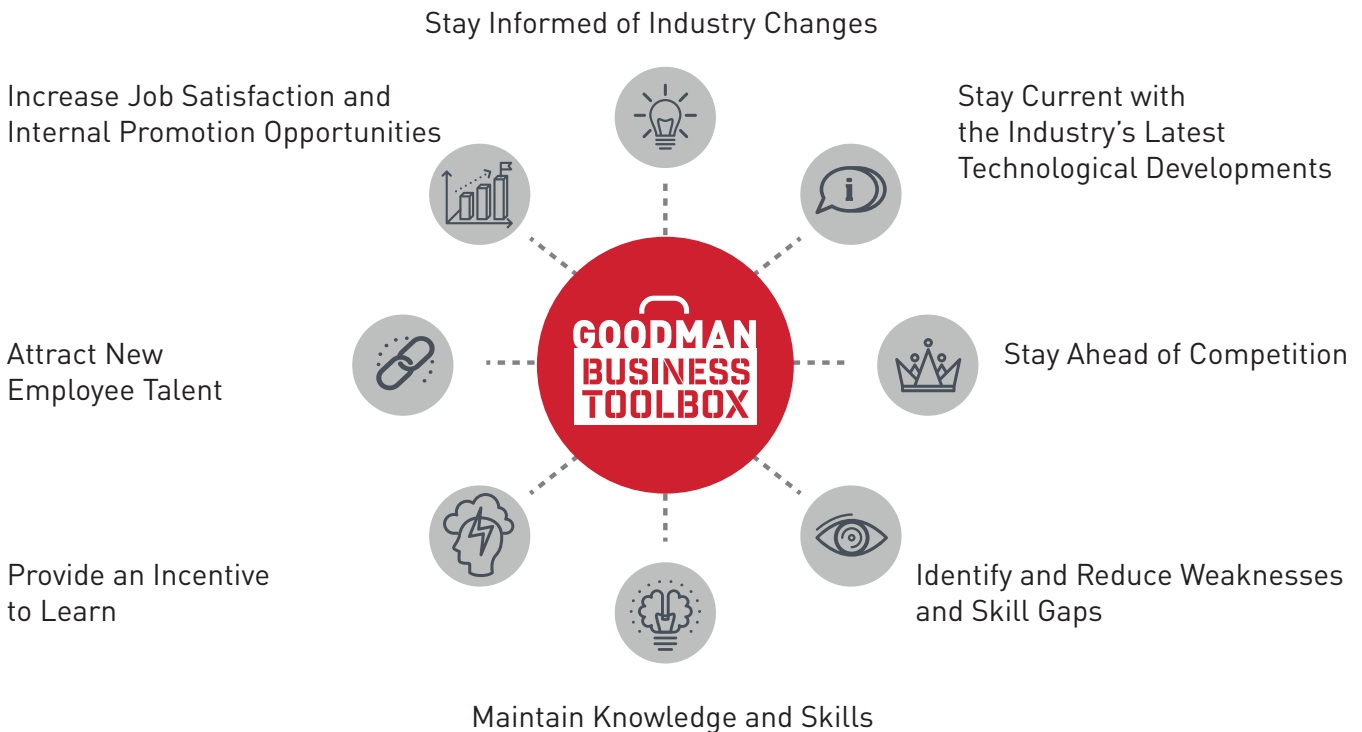
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# You Asked, We Answered

QUESTIONS ASKED BY NATE-CERTIFIED TECHNICIANS, ANSWERED BY THE NATE TEAM AND SHARED WITH YOU.



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You can apply through our website, [www.NATEX.org](http://www.NATEX.org), to become a NATE Testing Organization (TO), and administer NATE exams. We encourage interested organizations to become active parts in improving the quality of the HVACR workforce by becoming a NATE TO. The application is free and can be completed online.

A NATE TO must agree to follow the NATE testing protocols and offer at least one testing session per year. It must have a minimum of one NATE-approved proctor to oversee exams. A proctor can be any person who is a member of the TO, but he or she must be approved by NATE.

## I RECENTLY COMPLETED A NATE EXAM. HOW DO I VIEW MY EXAM RESULTS?

If you took your exam online, results are available immediately after completion. Please allow 24 hours for your NATE account to reflect changes in certifications.

If you took a paper-and-pencil exam, once we have received your exam from your proctor and begin processing, we will email you a notification that the grading process has begun. We expect technicians to activate their accounts and complete set-up with a user name and password during this time. When exam results are released and entered into your account, you will receive a second email letting you know your results are available. Please allow 2-3 weeks after testing to receive your results.

## HOW CAN HOMEOWNERS CONFIRM THAT MY TECHNICIANS ARE NATE-CERTIFIED?

All NATE-certified technicians have a NATE ID number that can be verified through our website. Homeowners can visit the NATE website, and in the homeowners' section click on "Verify a Technician's NATE ID" tab. Entering a technician's NATE ID will bring up the certifications the individual has earned and when they expire. For more questions, you can contact us at [askNATE@natex.org](mailto:askNATE@natex.org).

## Word Search

1. Coolant	T P G E W A K D I E A A Y C
2. Global	N N J T T E L F Y C T K B M
3. Reduction	H O A L N A B Q L D K H S J
4. Flow	B D I L A E M I I O R P A S
5. Propane	M C Z T O X I I N W W R S N
6. Efficient	E M C D C O U C L A L O X U
7. Capacity	P G E J O U C L I C R P T Y
8. Efficiency	V S N P D E D A A F H A A D
9. Change	F A P A E E A E P B F N X W
10. Ethane	C F R L H K C M R A O E G B
11. Webinar	Y C N E I C I F F E C L A B
12. Climate	I X U S S T B F X J Z I G N
13. Transition	M Y C N O I T I S N A R T O
14. Code	U O Z L G X E B B K X C S Y
15. Split	

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# NATE News

## WELCOME NEW NATE BOARD MEMBERS

NATE is pleased to announce Kevin Traut as the new Chairman of the Board. Traut is administrative director of ITEC Training and Education Center, Rochester, New York. With 21 years of industry experience, 16 NATE certifications, and numerous educator certifications, Traut brings an incredible amount of skill and industry knowledge to the NATE Board. NATE relies on its Executive Committee, Trustees, and Advisory Council to guide NATE's decisions and keep abreast of industry trends.

Traut succeeds Kevin Dier, who concluded his two-year term this past October following the most recent NATE Executive Committee Meeting.

NATE also welcomed a new member to the NATE Board of Trustees, Randy Roberts. Roberts is vice president of sales and marketing, Rheem Manufacturing. Roberts has been with Rheem for over 20 years and has worked closely with NATE for many years.

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## REFRIGERATION STUDY GUIDE AVAILABLE IN NATE ONLINE STORE

In the next few weeks, NATE will release a new Refrigeration exam designed to validate a technician's knowledge of the low-Global Warming Potential (GWP) refrigerants the HVACR industry is adopting due to new state and federal regulations. While the new low-GWP refrigerants are more efficient and better for the environment, these products are more advanced and complicated for HVACR technicians to work with. The NATE refrigerant exam is designed to ensure that HVACR engineers and technicians have the necessary skills and job knowledge to handle refrigerants of all types.

NATE is releasing the new exam, titled *Low GWP Refrigerants: The Industry's Refrigerant Certification*, with an accompanying study guide, to help technicians prepare for the test. The guide is available for purchase in the NATE online store. For more information about the exam and guide, contact Daisy Weill at [dweill@natex.org](mailto:dweill@natex.org).

## UPCOMING TRADE SHOWS THIS FALL

NATE is excited to return to in-person trade shows. NATE participated in the Goodman brand Fall Dealer Meeting in Columbus, Ohio, on November 9 and in Kentucky on November 11. On November 16, NATE joined IHACI's 41<sup>st</sup> Annual Trade Show in Pasadena, California. For more information on where to find NATE at upcoming events, visit NATE's Events and Tradeshows webpage.

# Industry News

## LENNOX INTERNATIONAL INC. TACKLES CLIMATE CHANGE

Richardson, Texas-based Lennox International Inc. (LII) announced a formal commitment to set science-based targets on the reduction of greenhouse gas emissions. The company joined the Science Based Targets Initiative (SBTI)—a partnership among the CDP, the United Nations Global Compact, World Resources Institute, and the World Wide Fund for Nature—demonstrating its dedication to environmental sustainability.

The SBTI drives climate action in the private sector by enabling companies to set science-based emissions reduction targets.

Betty Ungerman, vice president, deputy general counsel/chief ethics and compliance officer and chair of the LLI Global Environmental Social Governance Council, says, “The HVACR industry plays a critical role in reducing greenhouse gas emissions and curbing climate change. LLI continues to lead the industry in innovation with our air conditioning, heating, indoor air quality, and refrigeration systems, and we are focused on reducing the emissions of our products and our operations.”



## SAVE THE DATE: AHR EXPO RETURNS JAN. 31-FEB. 2, 2022

The Las Vegas Convention Center is the site of the 2022 AHR Expo taking place Jan. 31-Feb. 2, 2022. The event, on hold last year due to the pandemic, serves as the hub for engineers, contractors, technicians, facility operators, architects, educators, and other industry professionals to explore the latest trends and applications in HVACR technology.

The event is co-sponsored by ASHRAE and AHRI and is held concurrently with ASHRAE’s Winter Conference, which begins on Jan. 29 and runs through Feb. 2.

The AHR Expo includes industry sessions, new product presentations, and free ASHRAE sessions that earn PDHs/CEUs.

Organizers note that as of November, masks are required for all attendees indoors, including vaccinated individuals. No masks are required in outdoor spaces. Social distancing in small areas is encouraged. There will be no temperature screenings, no capacity limits or one-way aisles, or no crowd density requirements.

Event organizers are monitoring recommendations from local health authorities, the CDC, and its partners. If you plan to attend, visit the AHR Show Health & Safety site for the most up-to-date safety information.

## AHR EXPO 2022 INNOVATION AWARDS WINNERS ANNOUNCED

The AHR Expo recently announced the winners of the 2022 AHR Expo Innovation Awards, whose purpose is to honor companies that are pushing the bar to create innovative solutions to difficult problems.

The Innovation Awards encourage exhibitors to submit new products and technologies for recognition via review and selection by a panel of third-party judges comprised of distinguished ASHRAE members. Entrants are evaluated on overall innovative design, the creativity of the product or service offered, application, and potential market impact.

Award winning products will be on display at the show. Winners were selected in 10 industry categories, as follows:

- **Building Automation**, iSMA CONTROLLI S.p.A./iSMA-B-MAC36NL Hybrid IoT Controller powered by Niagara Framework;
- **Cooling**, Danfoss/Danfoss Turbo-cor VTCA400 Compressor;
- **Heating**, Carrier/Infinity 24 Heat Pump with Greenspeed Intelligence;
- **Indoor Air Quality**, Antrum/AntrumX IAQ Facilities Monitoring System;
- **Plumbing**, Franklin Electric/Little Giant, Inline SpecPAK, Multi-Pump Pressure Boosting System;
- **Refrigeration**, ebm-papst Inc./Ax-iEco 630-910 Axial Fan;
- **Software**, Bluon Inc./Bluon Support Platform;
- **Sustainable Solutions (formerly Green Building)**, Enginuity Power Systems Inc./E/ONE Home Power System;
- **Tools and Instruments**, Fluke Corporation/Fluke 378 FC Non-Contact Voltage True-rms AC/DC Clamp Meter with iFlex; and
- **Ventilation**, Aldes/InspiraIR Fresh.

# NATE Offers New Certification for Low-GWP Refrigerants

EXAM AND STUDY GUIDE EMPHASIZE SAFETY PROCEDURES TO PROTECT TECHNICIANS ON THE JOBSITE.

The United States continues to phase out harmful, ozone-depleting hydrochlorofluorocarbon (HFC) refrigerants such as HCFC-22, a standard refrigerant for many decades. Earth's ozone layer helps protect us from ultraviolet (UV) radiation that can cause skin cancer and cataracts, notes the U.S. Environmental Protection Agency. It also protects plants, crops, marine ecosystems, and various materials such as plastics and paints from the adverse effects of UV radiation.

"New state and federal regulations are phasing down the use of HFCs in air-conditioning and refrigeration equipment," explains John Lanier, chief operating officer of the North American Technician Excellence (NATE) organization. "In response, the HVACR industry is transitioning to new low-global-warming-potential (GWP) refrigerants. These changes mean our industry is adopting refrigerants that are more efficient and better for the environment. However, these products are also more advanced and complicated for HVACR technicians to work with."

NATE developed a refrigerant exam and accompanying study guide to keep HVACR contractors and technicians up to date on HCFC-22 replacement R-410A and the new GWP refrigerants such as R-32. These materials are available for all HVACR techs as of Nov. 1, 2021.

"The NATE refrigerant exam is designed to ensure that HVACR engineers and technicians have the necessary skills and job knowledge to handle refrigerants of all types," Lanier notes. "The exam covers all aspects of a technician using refrigerants, including the proper handling, transportation, charging, evacuation, and reclamation of refrigerants — with an especially strong emphasis on safety."

Anthony Spagnoli, NATE's director of testing and education, adds: "These new refrigerants have additional safety concerns. This certification exam can be used as a tool to verify that technicians are aware of these new safety concerns and can safely and efficiently use these low-GWP refrigerants."

NATE certification is well-established and well-respected in the HVACR community. The organization notes that roughly 7,000 to 8,000 technicians take one or more NATE certifications; another 6,000 recertify using continuing education.

"THE HVACR INDUSTRY IS TRANSITIONING TO NEW LOW-GLOBAL-WARMING-POTENTIAL (GWP) REFRIGERANTS. THESE CHANGES MEAN OUR INDUSTRY IS ADOPTING REFRIGERANTS THAT ARE MORE EFFICIENT AND BETTER FOR THE ENVIRONMENT. HOWEVER, THESE PRODUCTS ARE ALSO MORE ADVANCED AND COMPLICATED FOR HVACR TECHNICIANS TO WORK WITH."

- John Lanier, chief operating officer, NATE

## TURNING TO THE EXPERTS

As with all of its certification exams and study guides, NATE turned to subject matter experts (SMEs) on its Technical Committee, as well as those who manufacture today's eco-friendly refrigerants, Spagnoli notes.

One of those experts is Jeff Warther, HVACR training/business development manager for The Chemours Co., which manufactures a low-GWP refrigerant. He is part of the Technical Committee's Resource and Study Guide group and has spent his entire career in the HVACR industry.

Starting as an HVACR technician, Warther obtained associate's and bachelor's degrees that took him down different paths in the industry. He is NATE-certified in air conditioning/heat pump and commercial refrigeration service.

"Anytime the HVACR industry goes through a significant change, it's important to not only highlight the changes but also to give the industry a chance to refresh everyone on the basics," he explains. "Training and testing (or certification) are critical to making sure the vital information is being presented correctly.

"As we move from an ASHRAE Standard 34, A1 classification of refrigerants, to an A2L classification, it will be imperative to follow the basics of installation and servicing, as well to understand how equipment and installations will be different."

The stand-alone exam is 70 multiple-choice questions; technicians are given two hours to complete it. Any technicians that will be using the new low-GWP refrigerants should consider taking the refrigerant certification test.

"Taking the training courses offered by the industry and having a working knowledge of refrigerant management is the best way to prepare," Spagnoli says. "NATE is also releasing a study guide to help prepare technicians for



the exam. Also, we are working with one of our training partners to create an online training course on this topic. We hope to have that available sometime next year.”

Warther adds: “The NATE study guide is an excellent resource to help technicians understand the basics of different topics that will be covered within the exam. However, it is critical that this guide is not treated as the sole source of preparation for the exam. It is best to find a distributor or organization that will use this program as a building block for the training. A good trainer will pull together additional, in-depth information from webinars, articles, industry studies, or personal experiences to add more value to the NATE study guide.”

Robin Gault-Winton, who helped develop the study guide with NATE, spent 6-1/2 years as director of learning solutions at assessment and survey developer Scantron Corp.

“While at Scantron, I was hired to write the first version of the Flammable Refrigerant Study Guide that was published in 2019,” she explains. “This version, in partnership with the Air-Conditioning, Heating, and Refrigeration Institute (AHRI) and United Nations Environment Programme (UNEP), was directed at a global audience.

“When it was time to develop the version directed at the U.S. audience, NATE hired me again since I was familiar with the outline and approach. I worked with a great group of subject matter experts that consisted of both refrigerant experts and technician experts.”

Warther notes that while the Resource and Study Guide Group was not directly involved in the exam preparation, members were given the exam topics and then given the task of providing as much detail as possible on each topic.

“I believe this format prevents the answers to the exam questions from being directly stated in the study guide,” she states. “This format requires the technician to understand the topics fully and not just memorize the answers from the study guide.”

Gault-Winton says the study guide is written using the same framework as the exam.

“The format of the study guide follows the competency framework, with domains defining book chapters and the tasks of that domain acting as sub-headings within the chapter,” she explains. “The order may be rearranged from how they appear in the framework to facilitate the instruction necessary to study for the exam.”

In determining length, she and the resource group members considered how many domains and tasks were included in the certification exam and the amount of information needed to cover them. The team also added a study plan and references to the guide.

“This exam and study guide covering the growing use of flammable refrigerants is an example of how NATE stays on top of the changes impacting the HVACR industry,” Gault-Winton adds.

Warther notes that the study guide was created by looking at five areas: installation, service, safety practices, refrigerant classifications, and service tools for flammable refrigerants.

“The exam questions and study guide information were separate committees,” he explains. “This way, the study guide focused on the information needed for the five areas. I don’t feel the length of the study guide was ever a concern. The committee spent as much time as it felt was needed for each of the areas covered.”



“THESE NEW REFRIGERANTS HAVE ADDITIONAL SAFETY CONCERNS. THIS CERTIFICATION EXAM CAN BE USED AS A TOOL TO VERIFY THAT TECHNICIANS ARE AWARE OF THESE NEW SAFETY CONCERNS AND CAN SAFELY AND EFFICIENTLY USE THESE LOW-GWP REFRIGERANTS.”

– Anthony Spagnoli, NATE director of testing and education

Warther adds: “No technician should ever stop learning about this industry. There are resources available to make the technicians’ job easier and to keep them safe from injury. Technicians gaining this certification sooner rather than later will help them navigate misinformation that will crop up during this transition. Knowledge is power, and it helps eliminate any fears or concerns regarding these new refrigerants.” ●

Kelly Faloon is a contributor to the *NATE Magazine*.



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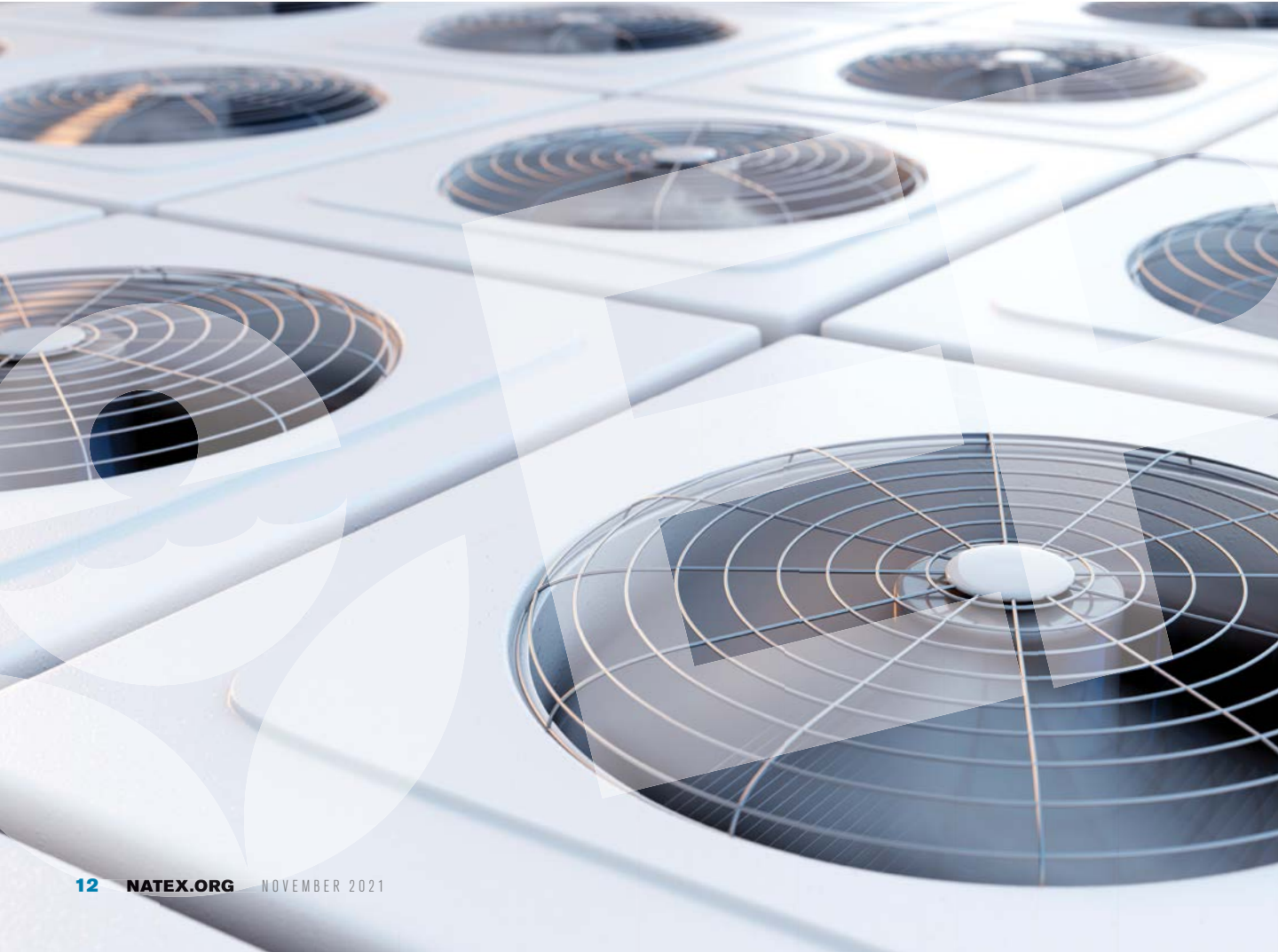
### ADDITIONAL INFORMATION

Before purchasing this appliance, read important information about its estimated annual energy consumption, yearly operating cost, or energy efficiency rating that is available from your retailer.



# Manufacturers Ge Up for Changes in Refrigerant Regul

THEY LOOK TO NATE TO ENSURE TECHNICIANS ARE UP-TO-DATE ON LATEST BEST PRACTICES AND IN



# ar ations

## INDUSTRY STANDARDS.



Photo: © Farakos | Dreamstime.com

Manufacturers like Trane Residential are working to comply with changing refrigerant requirements, notes Katie Davis, vice president of engineering and technology, Trane Residential. “As a company with a complete commitment to sustainability,” she says, “the phase-down of hydrofluorocarbons (HFCs) is necessary to achieving success in our climate commitment. The new EPA refrigerant regulations are opportunities to accelerate clean technologies for heating and cooling in sustainable ways.” Davis explains that Trane Residential supports the phasing down of high Global Warming Potential (GWP) refrigerants in line with the Kigali Amendment to the Montreal Protocol. She adds: “In order to support the regulations, we will be providing innovative product designs that support refrigerants with lower GWP.”

With a history of making buildings more sustainable for 135 years, Johnson Controls is a global leader in the effort to decarbonize buildings, says Buddy Saucier, vice president of HVAC service. The manufacturer uses refrigerant fluids in multiple HVACR product platforms that serve a variety of global markets and applications. Saucier says his firm has successfully implemented HFC refrigerant phase-

down requirements in various international markets, and the company is in full support of the EPA’s HFC phase-down schedule for the U.S. The schedule was covered in the American Innovation and Manufacturing (AIM) Act that was enacted by Congress on December 27, 2020.

“The most widely used HFC refrigerants in HVACR products are R-410A and R-134a, both of which will be impacted by the EPA phase-down schedule,” says Saucier. Most Johnson Controls products, which presently utilize R-410A, an ASHRAE 34 designated A1 non-flame propagating refrigerant, will have to convert to an ASHRAE A2L, a mildly flammable refrigerant.

In May 2021, Johnson Controls announced that R-454B will serve as its primary low-GWP refrigerant in ducted residential and commercial unitary products as well as air-cooled scroll chillers in North America and specific international markets where codes are in alignment. “This transition away from the use of high-GWP refrigerants, such as R-410A, reinforces the company’s commitment to addressing climate change and lowering customers’ emissions for a healthier, more sustainable planet,” Saucier explains.

The EPA has announced that by January 1, 2025, all new equipment

“AS A COMPANY WITH A COMPLETE COMMITMENT TO SUSTAINABILITY, THE PHASE-DOWN OF HYDROFLUOROCARBONS (HFCs) IS NECESSARY TO ACHIEVING SUCCESS IN OUR CLIMATE COMMITMENT. THE NEW EPA REFRIGERANT REGULATIONS ARE OPPORTUNITIES TO ACCELERATE CLEAN TECHNOLOGIES FOR HEATING AND COOLING IN SUSTAINABLE WAYS.”

- Katie Davis, vice president of Engineering & Technology, Trane Residential



manufactured must be used with a lower GWP refrigerant, with the maximum level for stationary air conditioning being set at 750. “Beginning on January 1, 2025, all new equipment produced by Rheem and other OEMs will have to use one of these more climate-friendly refrigerants that have a lower GWP,” explains Karen Meyers, Rheem vice president of government affairs and chair-elect of the Alliance for Atmospheric Policy. “Rheem is preparing to introduce new lines of equipment because we will be required to use the climate-friendly refrigerants with any new equipment manufactured beginning that day, January 1, 2025,” she says. Rheem is also designing its equipment to meet new EPA minimum efficiency standards set to start in 2023.

“Refrigerant changes are not new to the industry. We have seen the evolution from CFC to HCFC to HFC, and blended refrigerants and now moving to HC- and HFO-based refrigerants. We always say that ‘change can be good, but it’s just not always easy,’” says Randy Tebbe, technical services engineering manager, Emerson. He adds that the goal of reducing ozone depletion and the global warming effects of released gases is certainly a positive step forward for the environment.

Tebbe says the recently announced regulations are forcing the industry to move from an A1 to an A2L or even an A3 refrigerant designation. “As with any manufacturer, our first concern is for the safety of the product we supply to the field. Due to the flammable designation, electrical components’ service practices/processes need to be updated to mitigate any concerns (including leak detection) that might occur in the field.”



“BEGINNING ON JANUARY 1, 2025, ALL NEW EQUIPMENT PRODUCED BY RHEEM AND OTHER OEMS WILL HAVE TO USE ONE OF THESE MORE CLIMATE-FRIENDLY REFRIGERANTS THAT HAVE A LOWER GWP.”

- Karen Meyers, Rheem vice president of government affairs and chair-elect of the Alliance for Atmospheric Policy

Tebbe confirms that application bulletins will be updated to address likely concerns and provide guidelines to ensure a safe and reliable compressor operation. “From the manufacturing side of the compressor, Emerson needs to evaluate every new compressor/refrigerant and oil combination to help ensure a very reliable product is released to the field. This testing and evaluation will include performance testing and rating of the compressor at various conditions so that system manufacturers can apply the products into their systems effectively.” Tebbe adds that the review process will also include thousands of hours of reliability testing and component compatibility studies to understand the wear patterns associated with the new refrigerants and if any component redesigns are required to ensure the proven reliability of his firm’s products.

### **BUILDING BLOCKS FOR REFRIGERANT TRAINING**

Industry is at the start of a refrigerant transition phase-down, says Jeff Warther, training and business development manager, The Chemours Company, a global chemistry firm. The company manufactures thermal management and specialized solutions including Opteon and Freon refrigerants. “The intent is to reduce

the climate impact of HFCs and their carbon dioxide equivalent (CO<sub>2</sub>EQ) over time. For instance, the EPA will implement a 10 percent reduction of the CO<sub>2</sub>EQ baseline in 2022-2023. Higher GWP refrigerants such as R-410A will be phased down and will be replaced by low GWP alternatives such as R-454B in the future,” Warther explains.

Down the road, technicians will require some additional training on the newer refrigerants. “First, good training programs must be created. This is going to be done in a two-step process. Many industry partners, such as NATE, AHRI, ASHRAE, ACCA, ESCO, UL, and others have worked together to create training programs. These programs are available today and help educate the contractor and technician on the unique characteristics of the refrigerants and the installation and service tools needed,” Warther says.

The second step will be when OEMs build training programs specifically tailored to their equipment and how they are managing the new refrigerants. His conclusion: “The combination of the organizational resources and the OEM programs will be the building blocks for the training on the new refrigerants.”

Tim Smith, an Interplay Learning in-house subject matter expert with 32 years of experience in the industry, says, “Advanced HVACR technicians



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can expect minimal changes to their existing training apart from training on new tools and safety practices that come with working with A2L refrigerants that are considered mildly flammable.” He adds that newer HVACR technicians should continue to be trained on the older refrigerants until current systems using R22 and R410A are completely out of commission. He recommends that technicians consider taking training courses from vendors, OEMs, and trade and certification organizations. Interplay Learning is a provider of online and virtual reality training for the skilled trades.

Carrier is preparing technicians for the refrigerant transition, says Lindsay Bull, manager, residential education and technical literature. “My Learning Center, Carrier’s online learning portal, offers 24/7 courses for contractors to prepare for their EPA 608 certification exam. We continue to update that material as needed, moving forward toward the 2025 phase-down.”

She adds that the EPA Section 608 preparation courses offered are also certified for NATE CEUs to encourage technicians to complete the EPA training while earning needed hours for their NATE certifications. “This has been a focal point in Carrier’s curriculum and will continue to be one as we move toward 2023 and 2025 regulatory changes for refrigerants.”

Bull says NATE certifications help ensure that the job is done right the first time. “Technicians that earn and maintain these certifications can provide additional peace of mind to their customers. Homeowners can feel confident that they’re working with technicians who have a solid understanding of the latest best practices, techniques, and industry standards.”

NATE is preparing and planning to release a refrigerant certification

exam and accompanying study guide. The NATE refrigerant certification would be in addition to the minimal requirement of the EPA 608 exam.

Phil Oglesby, manager of education and content at Rheem, served on the committee that evaluated test questions for the NATE refrigerant certification program. He describes the committee assignment as “very necessary.” According to Oglesby, the committee prepared the NATE refrigerant certification test, going through the test question by question.

“We had approximately six or seven conference calls,” says Oglesby. “It is a necessary but lengthy process, because when you get 10 HVACR professionals in a room, and you start having discussions, there’s going to be nuance and some minor disagreements among the group. It’s really just trying to filter through all of that so we can come up with an end product that makes sense to everyone. That’s not as easy as it sounds.”

Doug Smiley, Lennox technical training manager, says there are wins all around when HVACR techs earn their NATE certifications or recertifications, as well as EPA Section 608 refrigerant certifications. “There are key benefits to the homeowner, technician, and the dealership owner. The benefit for the homeowner is that it provides assurance that the technician is qualified to do the job at the highest standard and handle refrigerants safely and responsibly. For technicians, it provides a certification that highlights their commitment to industry excellence. Finally, it provides benefits to the dealership by having a qualified technician who can successfully carry out jobs to a higher degree.” ●

Michael Keating is a contributor to the *NATE Magazine*.



“THERE ARE KEY BENEFITS TO THE HOMEOWNER, TECHNICIAN, AND THE DEALERSHIP OWNER. THE BENEFIT FOR THE HOMEOWNER IS THAT IT PROVIDES ASSURANCE THAT THE TECHNICIAN IS QUALIFIED TO DO THE JOB AT THE HIGHEST STANDARD AND HANDLE REFRIGERANTS SAFELY AND RESPONSIBLY. FOR TECHNICIANS, IT PROVIDES A CERTIFICATION THAT HIGHLIGHTS THEIR COMMITMENT TO INDUSTRY EXCELLENCE. FINALLY, IT PROVIDES BENEFITS TO THE DEALERSHIP BY HAVING A QUALIFIED TECHNICIAN WHO CAN SUCCESSFULLY CARRY OUT JOBS TO A HIGHER DEGREE.”

- Doug Smiley, Lennox technical training manager



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# Preparing the HVACR Community for New Refrigerant Standards



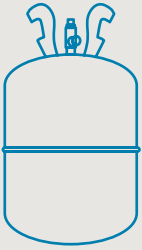
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**AHRI WEBINAR SERIES FOCUSES ON TRAINING AND EXAMS GEARED TO TECHNICIANS.**

**T**he Air-Conditioning, Heating, and Refrigeration Institute (AHRI) recently presented a Refrigerant Webinar Series that updated industry professionals on new alternative refrigerants and changing standards. It also focused on refrigerant training and exams geared to HVACR technicians.

For decades, governments around the world have been regulating refrigerants. There now is a global treaty in effect—the Kigali Amendment to the Montreal Protocol—that establishes a phase-down structure for hydrofluorocarbon (HFC) refrigerants.

In anticipation of such an agreement, AHRI initiated a research program in 2011 to identify suitable alternative refrigerants. Most of those identified have low toxicity, but in some cases, they have different flammability characteristics



## NATE REFRIGERANT EXAM

NATE is developing a refrigerant exam that will be geared mostly towards residential and light commercial technicians; it also will have general safety information that is relevant to all commercial technicians. The exam will cover topics such as HFC allowances and phase-down, tools, installation, service, and safety.

The refrigerant exam will be an additional certification, in addition to the required EPA 608 certification. "There is no recertification element to the EPA 608," says Gurinder Sidhu, NATE senior director of business operations. "Our NATE refrigerant exam will have a recertification component to it; after two years, you can take the exam or do 16 hours of continuing education."

Resources are available via NATE to help HVACR technicians learn more about new refrigerants and relevant standards, and to prepare for the NATE exam. "In addition to the study guide, many trainers and manufacturers have or will have training available. Members of the NATE Technical Committee reviewed the job task analysis and created a study guide to accompany the refrigerant exam," Sidhu adds.

than those in use today. In a follow-up research program, AHRI, the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), the U.S. Department of Energy (DOE), and other stakeholders have invested more than \$7 million to study the safe use of alternative refrigerants that are classified as flammable or mildly flammable.

"AHRI members saw the pending patchwork of regulations and were determined to support an orderly transition: a global phase-down of HFCs or high *global warming potential* (GWP) gases by gradually reducing the use of controlled fluids," says Helen Walter-Terrinoni, AHRI vice president of regulatory affairs. This would provide regulatory certainty and help everyone prepare for the transition.

To that end, AHRI established a Safe Refrigerant Transition Task Force (SRTTF) in 2019 to ensure that the supply chain and stakeholders are prepared for a safe transition to low-GWP refrigerants. The task force comprises more than 200 AHRI members and other stakeholders employed by contractors, government agencies, distributors, first responders, and environmental and training organizations.

The Task Force has clarified shipping requirements with the Department of Transportation (DOT), created training programs, and worked on the adoption of safety standards into building codes. It also has provided stakeholders with a large body of knowledge about new refrigerants.

Anthony Spagnoli, director of testing and education at NATE, participated in AHRI's Safe Refrigerant Transition Task Force. He provided information about how certifications work and gathered information on what other organizations in the industry were working on in regard to alternative refrigerants. "NATE has been a key partner in SRTTF from the beginning. In fact, NATE was involved in research and presentations before SRTTF was conceived," Walter-Terrinoni says.

## REFRIGERANT KNOW-HOW

The AHRI Refrigerant Webinar Series was created to provide stakeholders with important background information and to answer their questions. During the series, presenters covered research that has been completed to determine upgrades to safety standards. They discussed available tools to use with next-generation refrigerants and covered the relationship between safety standards and building codes. A summary of the webinar series to date follows.

### AIR CONDITIONING APPLICATIONS

Walter-Terrinoni led a panel of experts to discuss leak and ignition testing of low-GWP refrigerants in air-conditioning equipment under whole room scale conditions, as well as refrigerant leak characteristics in real-life applications.

### COMMERCIAL REFRIGERATION APPLICATIONS

Experts discussed IEC/UL Standard 60335-2-89 on refrigerant charge level requirements and summarized recent test results on dispersion and ignition tests of low-GWP refrigerants in commercial refrigeration display cases. The webinar included a comparison of A2L and A3 refrigerants for single-door and three-door reach-in coolers.

### UNDERSTANDING REFRIGERANT SENSORS

This session introduced the flammability risk mitigation concept using refrigerant sensors and reviewed the differences in sensor requirements across key safety standards.

### PREDICTIVE TOOLS FOR REFRIGERANT BEHAVIORS

Scientists with Oak Ridge National Laboratory and the National Institute of Standards and Technology introduced their modeling tools and discussed the tools' applicability to simulating refrigerant dispersions and predicting the burning velocity of refrigerant blends.

### REFRIGERANT IGNITION IN OPEN FLAME/HOT SURFACES: HAS ANYTHING FUNDAMENTALLY CHANGED?

This session focused on understanding the implications of exposing fluorinated refrigerants to fire or hot surfaces as well as a comparison of legacy and low-GWP refrigerants relative to heat and gases generated during these events.

### A2L REFRIGERANT BEHAVIOR IN A STRUCTURE FIRE

Experts discussed preliminary findings from a project designed to show how low-GWP refrigerants classified as "A2L" or "lower flammability" may behave in a structure fire.

### REFRIGERANT DETECTION SYSTEMS (RDS) 101

AHRI Senior Director of Regulatory Affairs Mary Koban led a panel of industry experts to explain what comprises an RDS, the function of an RDS in an HVACR system, how these systems are constructed per UL 60335-2-40, and the importance of proper servicing and maintenance.

### SERVICING A2L REFRIGERANT SYSTEMS

The HVACR industry is phasing down common refrigerants to those with a lower GWP—many of which are classified by ASHRAE A2L, or lower flammability. Experts discussed the many changes to building codes and industry designed to accommodate the safe use of these refrigerants.

### A2L REFRIGERANTS AND TACTICAL CONSIDERATIONS FOR FIREFIGHTERS

The UL Firefighter Safety Research Institute, in partnership with members of the fire service and AHRI, developed firefighter training related to the refrigerant transition mandated by federal and state regulations. A panel of experts provided an overview and excerpts from the training.

### CODES AND STANDARDS "UNLOCKED"

This webinar described new codes and standards and how they differ, as well as the process for developing consensus standards, and how to prepare for the transition to alternative refrigerants.

### JOINT TYPES AND A2L REFRIGERANTS

AHRI welcomed HVACR technicians to learn which fittings perform best, based on ASHRAE's testing of the leak performance of different types of fittings installed by technicians. Experts discussed fitting evaluations in the UL 207 standard, how the standard is used to evaluate fittings, and ASHRAE research project results.

### HVACR EQUIPMENT NEEDED FOR SAFE REFRIGERANT TRANSITION

This webinar examined the equipment needed for installing and servicing HVACR equipment that will contain the new A2L refrigerants and where it can be obtained.

### THE HFC PHASE-DOWN: IMPLEMENTING THE AMERICAN INNOVATION & MANUFACTURING ACT

The AIM Act will phase down the production and consumption of HFCs in the U.S. over the next 15 years. The panel discussed legal and policy drivers, current and future regulatory requirements, and other strategic considerations as manufacturers begin to shift toward substitutes and alternatives.

Walter-Terrinoni believes the AHRI Webinar Series has been beneficial to HVACR technicians. "AHRI would appreciate any requests for additional topics that the readers of the *NATE Magazine* would like us to include in future communications and seminars," she says.

What feedback has AHRI received from the HVACR community during and after the webinars? "Hundreds of people attend our webinars, and the feedback is generally one of interest and encouragement, with requests for more information and more webinars. Many questions are generated, and we try to respond to them in the webinars or in the SRTTF newsletter," Walter-Terrinoni says. "All of the webinars are free and available to the public. They have all been recorded and posted on our website." ●

Neal Lorenzi is a contributor to the *NATE Magazine*.

### MORE AHRI INFORMATION IS AVAILABLE VIA THESE LINKS.

- <https://www.ahrinet.org/saferefrigerant>
- <https://www.ahrinet.org/news-events/webinars/ahri-refrigerant-webinar-series>

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# Advanced Air & Metal—The Value in Education



AT ADVANCED AIR, THE NATE PROGRAM HAS BECOME CENTRAL TO THE COMPANY'S CONTINUING EDUCATION INITIATIVES.

Advanced Air was formed in 1994 by Scott Friesen and Scott Rosendahl, who ran the company in its earliest days out of a garage. Rosendahl came from the service side of the industry, while Friesen came from the design and install side. It made for a natural—and successful—partnership.

Advanced Air has since developed into a multi-million-dollar company, one of the largest HVACR contractors in southern Oregon, serving the greater Medford area. About 350,000 people live within the company's 35-mile service radius. Currently, the company employs 42 HVACR professionals, six of which are specifically service technicians.

Various departments within the company handle installation, commercial new, commercial replacement, commercial service, residential new, residential replacement, and residential service. That includes anything from small, residential multi-unit projects to large custom homes to commercial re-configurations to design-build to spec-build; everything from an \$80 service call to a multi-million dollar install.

### A FOCUS ON CONTINUING EDUCATION

The company has always embraced continuing education for its employees, but the NATE program became central to that effort about 10 years ago when Randal Lee, Advanced Air's chief operating officer, came on board. "I've relied on it more heavily than we had in the past," Lee says. "When I came on as general manager/operations manager, I made it more of a fundamental piece of both our service and our install professional development...whether you're a service technician or an installer, the NATE 'Ready-to-Work' curriculum is part of the onboarding process.

"Every employee that is hired at Advanced Air," he continues, "receives a NATE ID on his or her first day. And, we hype it up. We tell these new staffers, 'Hey, this is pretty cool. Even though you're not NATE-certified today, you're going to have a NATE profile and a NATE ID, and from there we are going to build on your professional development.'"

With the labor market so tight, Advanced Air has made in-house training and development a key part of its growth strategy. Advanced Air pays 100% of the tuition costs and professional development costs for its employees.

"We understand that if we want to grow and thrive corporately, we have to invest in each individual, and we have to convince them to invest their time and energy into professional development," Lee says. "This is a really big deal for our company. It's part of the vision statement that's on our wall. This is a very innovative industry, and it's always getting smarter. It's not the HVACR industry of 20 or 30 years ago. It's extremely technical, it's extremely complex, and to stay ahead of the curve, we need an educated workforce. So that's part of Advanced Air's strategy for the next generation."

While NATE is the cornerstone, Advanced Air also incorporates training and materials from ACCA, OSHA, and manufacturers' training programs. The company



is a Bryant factory authorized dealer, so Advanced Air techs are put through factory training, as well. Advanced Air's employees also receive soft skills training through companies such as Grandy & Associates.

Advanced Air uses a tiered job description structure. Whether the employee is in service or install, management or administration, there are multiple levels at each position for the job descriptions, with checklists for each job level. Part of that checklist is skills training, and part of it is theory and administrative training. The company does a safety and training

meeting the first Tuesday of each month where they discuss important issues and train as a group.

In addition, there is individual time set aside each month where employees can study and take their NATE exams, their EPA 608 exams, their brazing exams, different manufacturer training, and tutorials on an individual basis.

So, while there is no formal incentive to pass certifications, certifications are part of a professional development journey that reaps clear rewards. “We don’t have a formal incentive structure, and that’s, in part, because due to market demand we’re paying above journey rates and apprenticeship rates,” Lee says. “We have each level and each checklist denoting what our expectations are to achieve a higher level of employment, and that criteria needs to be met. Certainly, there’s a range at each level—somewhere between \$3 to \$5 an hour. So, there is some informal flexibility to encourage and incentivize staff members to continue with their training, but it’s not formalized...however, it is certainly influencing what level they are at and how they are compensated.”

Technicians wear their NATE patches on their uniforms, and the company promotes NATE certification in its literature and on the company website. “We encourage our staff to demonstrate how this adds value to them, and to our company,” Lee explains. “I think the public, in general, is more interested in knowing what kind of training our employees get and what that means. They understand that HVACR is a very technical trade, and they want the assurance that the technicians sent to their home or place of business are educated and trained in the current technologies.”

## THE WHY FACTOR

Part of being on top of current technologies in the trade means understanding the newest refrigerants and

“I WANT THEM TO UNDERSTAND WHY THEY’RE DOING THE THINGS THEY’RE DOING...IT HELPS YOU DIAGNOSE PROBLEMS, IT HELPS YOU DESIGN SYSTEMS, IT HELPS YOU MAXIMIZE YOUR TIME, IT HELPS YOU SATISFY THE CUSTOMERS—IT JUST MAKES THE WORLD A BETTER PLACE.”

— Randal Lee, Advanced Air’s chief operating officer



how they work. While Advanced Air hasn’t yet participated in the new NATE refrigeration model, they plan to very soon.

“Even though we’re not maintaining or servicing chillers or refrigeration systems, it’s still a fundamental piece of HVACR theory. And we encourage our staff to not only know how to do something but also why they do something,” Lee says. “Understanding the why behind HVACR equipment and heat transfer and refrigeration cycles—if you understand the theory behind it, it’s easier to diagnose what’s going wrong. It’s easier to understand the system itself. Sometimes, you can infer what should be happening. If it’s not happening, you can understand where the breakdown is, and you can test it. But, if you don’t understand the theory, you’re going to have problems from the outset.”

This a conversation that Lee finds himself having with a lot of his younger employees who don’t always understand why they need to do book work and study for and pass exams. “They’re like, ‘Why do I have to do this? I’m just an installer, I’m just a service tech,’” Lee says. “I want them to understand why they’re doing the things they’re doing...it helps you diagnose problems, it helps you design systems, it helps you maximize your time, it helps you satisfy the customers—it just makes the world a better place.” ●

Steve Spaulding is Editor-in-Chief, CONTRACTOR magazine.

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# Florida Company Goes All In With NATE Certification

KOBIE KOOLING MAINTAINS FAMILY TRADITION OF TOP-NOTCH A/C SERVICE.



**K**obie Kooling Inc., Fort Myers, Florida, is a family-owned and operated air-conditioning and heating company that serves Southwest Florida. The Kobie name has been associated with professional air-conditioning service ever since “Poppie” Kobie founded Harry J. Kobie and Sons in 1949.

The Kobie Kooling of today was founded by four Kobie brothers in 1995. They were all taught by their father, who was in the air-conditioning business for decades. The company has since grown to 32 employees, including 18 NATE-certified techni-

cians. It is owned and managed by Mark Kobie, Fred H. Kobie, and Mike Cunningham. The company routinely runs calls ranging from preventative maintenance to designing new systems for commercial buildings. Its team of technicians also can install and is NATE-certified for air-conditioning and heat pumps.

“We are the only company in South Florida that has a completely NATE-certified team,” says Fred H. Kobie, president. “When you call our company, we send you a technician who has been trained and tested by somebody other than our own staff.

You get an industry-trained, certified professional every single time. We go to market promoting NATE in almost all of our written, radio, and TV advertising. We promote NATE daily on the radio and explain what the differences are between a NATE-certified technician and the average technician. It’s a part of how we go to market and who we are.”

## DIVING INTO CERTIFICATION

Kobie Kooling’s initial dive into NATE certification came with Lennox Industries’ training systems. Lennox offered HVAC Learning Solutions classes with



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Fred and Holly Kobie



“IN FACT, GOING THROUGH NATE CERTIFICATION HAS BEEN MORE DIFFICULT THAN GOING THROUGH THE STATE CERTIFICATION FOR LICENSING. EDUCATION AND TESTING IN THE INDUSTRY MAKE IT EASIER FOR EMPLOYERS TO SELECT CANDIDATES, AND EASIER FOR CONSUMERS TO SELECT A TRAINED TECHNICIAN. WHEN THEY SEE A NATE CERTIFICATION PATCH, THEY KNOW THAT THIS IS A REAL TECHNICIAN WHO HAS BEEN TRAINED AND CERTIFIED.”

– Fred H. Kobie, president

live labs and accepted students who were active in the HVACR industry. Attendees spent one week of hands-on training and testing. There were five levels of advancement and then NATE testing. “This took place in Sanford, Florida,” Kobie notes. “It was a great program. The expense of their salary, lodging, food, and the school itself was worth it because we received back a better mechanic.”

Since that time, Kobie Cooling has used the Tri County Apprentice program in Fort Myers, a four-year version of vocational training, and the Florida Academy, a nine-month vocational college. The company continues training, both online and in-person, at its facility. It supplements this with industry-specific trade classes taught by equipment manufacturers.

The initial training in Sanford was both hands-on and live-lab, where the instructor would set up trip switches and the student would do the diagnosis. The classroom training was conducted at the same school. “Now we do hands-on training, using our scrap units or warranty parts that are going back through recycling,” Kobie explains. “We can get into the

equipment and find out the ‘what’ and sometimes the ‘why’ when we cut them open. We also do this in a group, so we get multiple opinions and ideas as we train.”

Commercial and residential training is much the same for routine issues. Most commercial applications in the Fort Myers area are residential equipment installed in a business. “When dealing with larger commercial equipment, we always take the opportunity to use the expended unit to debrief the crew and go over what happened, what was found, how it was found, and how we dealt with it,” Kobie says. “For repairable systems, we use the training room to do this on our big screen TV that features photos and videos.”

Who are the trainers? Instructors are the owners and managers of Kobie Cooling as well as the NATE-certified technicians. “We have multi-credentialed leadership that leads most of the training, but most is multi-faceted and everyone gets involved. We also have representatives from equipment manufacturers who lead the instruction themselves,” Kobie says.

As for training tools, Kobie Cooling technicians have access to all online

NATE recertification classes. They also can take in-person classes and get paid while attending. The company offers tuition reimbursement for its apprentice attendees as long as they are passing with a certain grade and have demonstrated a commitment to work. “Education is so important. We promote any industry training for anyone who wants to learn. It has branched off into the mold industry and home inspection industry. We now have many multi-credentialed people onboard,” Kobie notes.

Routine training is performed weekly. “We meet every Tuesday for two hours, and the meetings involve everything from round-tabling a particular case, doing case studies, a class or online training series, or listening to an outside guest. We also do offsite classes when offered by manufacturers, sometimes locally, sometimes out of state, but we take advantage of them all.”

### A POSITIVE RESPONSE TO TRAINING

Why the need for courses to be NATE-recognized? “The need for certification and for technicians to be recognized as certified is very important in

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“JESSICA HAS MAINTAINED HER CREDENTIALS EVEN THOUGH SHE HAS COME OUT OF THE FIELD TO BE THE OFFICE MANAGER. HAVING SOMEONE WITH THAT SKILL AND THOSE CREDENTIALS MANAGING THE TEAM GIVES US MORE INDUSTRY KNOWLEDGE IN THE DISPATCHER POSITION.”

South Florida. Certification makes the credential visible and easy to recognize and certainly makes it easier for the consumer to select somebody they can trust and who has been trained and is knowledgeable,” Kobie adds.

“In fact, going through NATE certification has been more difficult than going through the state certification for licensing. Education and testing in the industry make it easier for employers to select candidates, and easier for consumers to select a trained technician. When they see a NATE certification patch, they know that this is a real technician who has been trained and certified.”

Kobie Kooling has a process for managing renewal of its courses. “Getting courses that are recognized by NATE is not easy, but as they become available, we take advantage of those classes, and the entire company usually attends. Individual technicians are responsible for keeping track of their continuing education units and reporting to NATE, but we have gone to a central reporting system where they send those training hours to NATE along with the renewal process, so that there’s a mass renewal of the technicians.

“NATE has been fair about reviewing the training that we do. The flexibility NATE shows in approving these classes makes the renewal process much easier. Our technicians go through four or five times the number

of hours of training required, but NATE has been fair and productive in the way they approve these classes.”

Overall, participants’ response to training initiatives has been positive. Kobie believes the average technician, as a general rule, likes the training and likes to improve on his or her skills. That’s true across all trades but especially in the air-conditioning business where technology is advancing at a rapid pace. There’s also the “cool” factor, and learning new things such as what happened during the Wi-Fi thermostat phase. “I’ve had no problems getting employees to attend classes and training. It’s always been very easy to fill those rosters.”

In Kobie Kooling’s case, effective training benefits the company, the customer, and the technician. “The benefit to technicians is an improvement over time to keep their skills honed, so their customers are satisfied, and they get fewer callbacks. Obviously, every technician wants to be the best, and the camaraderie and peer pressure to be the best is always a factor. For the company, providing a trained and certified technician gives the consumer a better product, and it is a major part of our marketing.”

Kobie stresses that consumers benefit because they are getting a better mechanic. “We all buy the same boxes, but how we install those boxes and how we service those boxes makes our product different. History has shown

us that our equipment lasts longer because of the way we take care of it, the way we fix it, and not having repetitive callbacks. When the consumer gets that quality product on a consistent basis, we waste less time, less fuel. A truck that’s idle or repeating its work is not a productive truck.”

### ALL IN THE FAMILY

Eight years ago, Fred’s daughter Jessica became the only female NATE-certified technician in Southwest Florida, he notes. “Jessica has maintained her credentials even though she has come out of the field to be the office manager. Having someone with that skill and those credentials managing the team gives us more industry knowledge in the dispatcher position.”

Fred Kobie himself has six NATE certifications, and all of the company owners are NATE-certified technicians. “This is not something we needed as contractors, because we are obviously state-certified, but we felt it important to lead by example and we went through the same training, same classes, and same certification testing as the rest of the employees.”

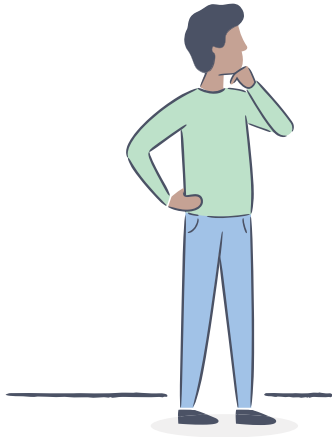
Over the years, Kobie has worked with Lennox Industries to help develop some of its air quality products. He was involved with Lennox R&D teams to develop and fine-tune air quality products that are now used across the country.




Looking ahead, Kobie Kooling is developing a second generation of company leaders, which includes Fred H. Kobie III, Michael Kobie, and Brandon Jones. This next generation is working in the field and will continue to seek NATE certifications. Kobie concludes: “We have apprentices working their way up to become technicians. The technicians at Kobie Kooling are and always will be NATE-certified.” ●

Neal Lorenzi is a contributor to the *NATE Magazine*.

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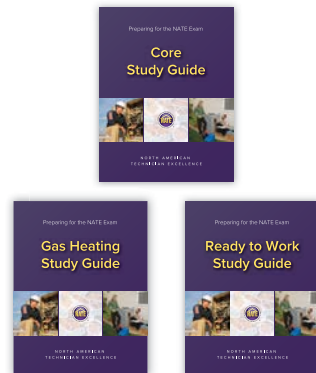
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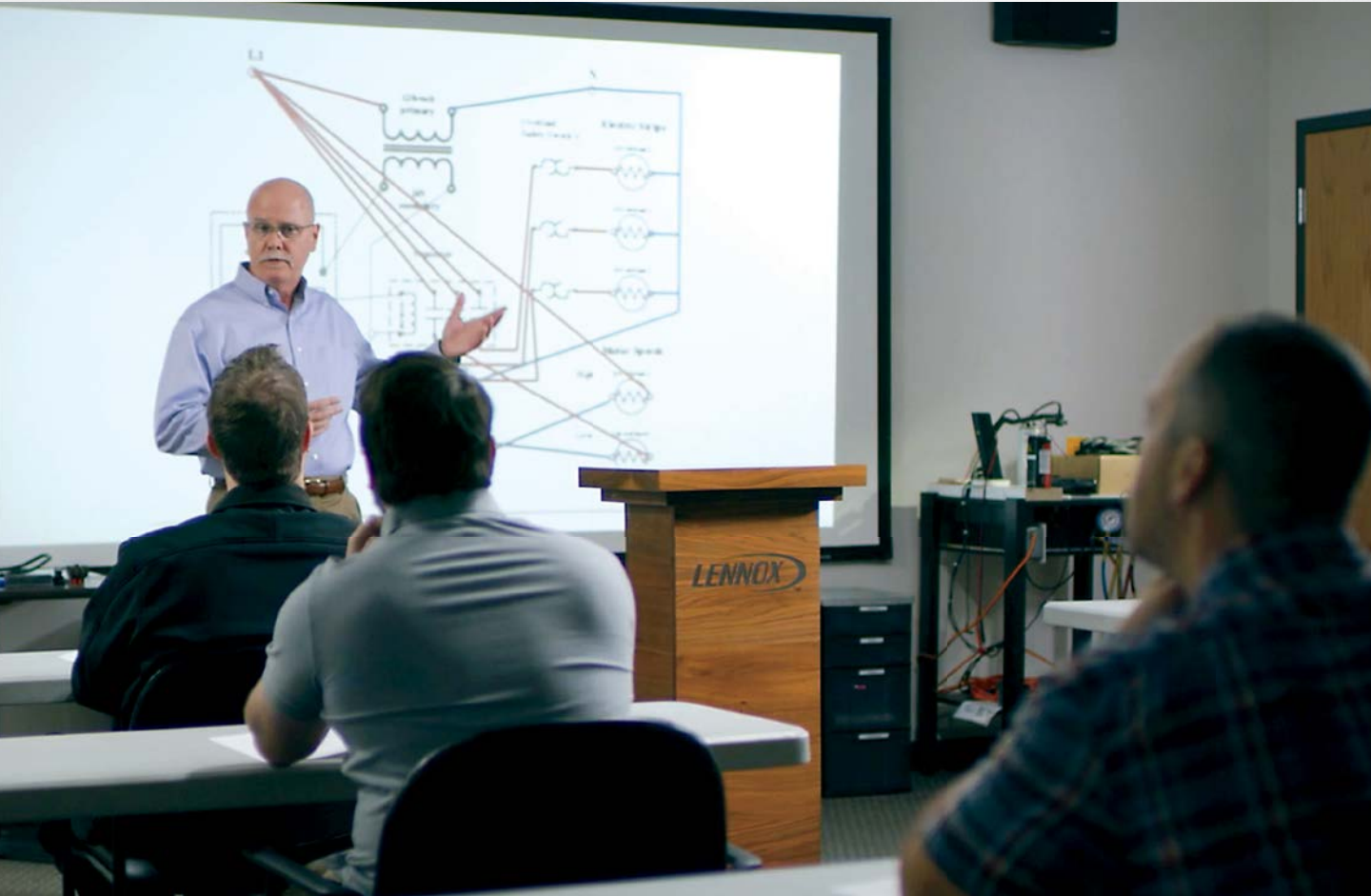
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