

A2L GUIDEBOOK

REVISED JULY 2024



NGH
NORTEK GLOBAL HVAC™

MAKING THE WORLD **BREATHE EASIER**

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APRIL 2024

To: NGH Distributors, Contractors, and Partners

From: NGH

2025 will be here before we know it, which means an industry-wide switch to a new refrigerant. Starting January 1, 2025, the industry is moving from R-410A to lower Global Warming Potential (GWP), A2L refrigerants. And for NGH, this new refrigerant is R-454B.

As members of the HVAC industry, we know how to navigate regulatory changes. It is our job as your partner to ensure you are ready for these changes with safe, high-quality products that are easy for contractors to install and service. This change will affect how contractors work with equipment, making communication even more critical.

That is why we have created this guidebook. We have collected all the information distributors and contractors need for the upcoming change and compiled it in one place. It covers both general information and details specific to NGH. As we draw closer to the implementation date, we will continue to add information to this guide, including relevant stocking lists, changes to dimensions, new SKUs, and more.

We are confident in our ability to help you navigate this regulatory change. Please do not hesitate to contact your NGH representative for more information or visit our A2L page on the NGH corporate website (www.nortekhvac.com/a2l-refrigerant-change).

We appreciate your partnership in this transition, and we will work to make it as smooth as possible.

A2L REFRIGERANT OVERVIEW

The passing of the 2020 **American Innovation and Manufacturing (AIM) Act** requires the phase down of hydrofluorocarbon (HFC) refrigerants. The **Environmental Protection Agency (EPA)** has finalized regulations that limit the Global Warming Potential (GWP) of air conditioning refrigerants to a maximum of 700 **starting in 2025**. At the same time, the EPA is implementing a phase down of other higher GWP refrigerants.

The AIM Act directs the EPA to phase down U.S. HFC production and use by approximately 85% over the next 15 years. This requires a transition from refrigerants like R-410A to a new generation of low GWP refrigerants.

The AIM Act phases down the consumption and protection of HFCs on the following schedule compared to a 2011-2013 baseline:

2022	→	10% REDUCTION
2024	→	40% REDUCTION
2029	→	70% REDUCTION
2034	→	80% REDUCTION
2036	→	85% REDUCTION

85%
REDUCTION
BY 2036

Many of today's commonly-used HFCs have very high GWP levels versus newer technology refrigerants. The most well-known HFC, R-410A, which is the dominant refrigerant used in today's residential sector, has a GWP of 2,088. The U.S. and Canadian markets last transitioned their unitary sectors from R-22 to R-410A in 2010. The issue with the 2010 transition was that it focused solely on addressing ozone depletion potential (ODP) and failed to address GWP.



NGH CHOSEN REFRIGERANT

Making the world breathe easier is our mission. It's fundamental to everything we do.

As such, NGH has decided that R-454B will serve as our refrigerant in all new residential and manufactured housing products. Moving to R-454B reinforces our commitment to developing solutions for a healthier, more sustainable environment.

WHY R-454B?

R-454B has the lowest EPA Significant New Alternatives Policy (SNAP) approved GWP for unitary applications of all ASHRAE classified A2L (low toxicity, mild flammability) refrigerants in the HVAC industry today - much lower than the 700 GWP limits finalized by the EPA. Other benefits include:

- > Lowest GWP replacement for R-410A, offering a 78% reduction in GWP
- > Close replacement for R-410A, making it easier for contractors due to fewer equipment design changes
- > Comparable discharge temperature and lower discharge pressure compared to R-410A
- > Comparable capacity and improved efficiency compared to R-410A
- > Excels in both normal and high-ambient conditions
- > Given the lower GWP, R-454B offers a better longer-term solution versus other R-410A alternatives, reducing the complexity for customers in the future
- > Minimizes the learning curve for installers and service technicians

WHAT IS THE DIFFERENCE WITH THE NEW A2LS?

R-454B is a blend of R-32 (68.9%) and R-1234yf (31.1%). R-454B has a best-in-class GWP of 466 and offers the best long-term viability as phase down regulations continue. It also has very similar operating pressures and temperatures to R-410A, which shortens the learning curve for equipment designers and service technicians.

While R-454B and R-32 fall below California's 750 GWP maximum limit, they are classified by ASHRAE 34 as a nontoxic, mildly flammable A2L refrigerant. Because of this A2L flammability designation, R-454B and R-32 cannot be used as drop-in replacements for existing R-410A equipment.

ASHRAE 34 FLAMMABILITY CLASSIFICATIONS

Higher Flammability	A3	B3
Flammable	A2	B2
Lower Flammability	A2L	B2L
No Flame Propagation	A1	B1
	Lower Toxicity	Higher Toxicity

The mild flammability of R-454B and other A2L refrigerants requires safety standards and state building codes be updated prior to their introduction. The process to update codes and standards is ongoing. The primary safety standards (UL 60335-2-40, 3rd edition or later, ASHRAE 15 and 15.2) that impact direct systems, such as unitary equipment, have been updated to accommodate the larger charge volumes found in typical U.S.-style split systems and packaged units.

[The big difference: R-454B falls into a new classification on the American Society of Heating, Refrigeration and Air-Conditioning Engineers \(ASHRAE\) Standard 34 flammability and toxicity matrix - A2L.](#)

A2L refrigerants are classified as having lower toxicity and lower flammability. Our current refrigerant, R-410A, falls into the A1 category for refrigerants with no ignition at or below 60°C. And while that makes A2Ls more flammable than A1s, such as R-410A, they are still much less flammable than natural gas or propane. According to AHRI research studies, the risk of fire remains low.

Here's why:

- 1** A2Ls, like R-454B, are hard to ignite (they require significant ignition energy), so they will not be ignited by static electricity.
- 2** A significant leak of an A2L, such as R-454B, would be required to reach the flammable concentration of 11.8% lower flame limit (LFL).
- 3** Concentrations of A2Ls, like R-454B, below the LFL will only burn while passing through a flame and will not ignite and sustain a flame.
- 4** If an unlikely ignition does occur, the resulting energy is very low with a burning velocity of about 2.0 inches per second.

PREPARING FOR THE TRANSITION

NGH has been in the process of redesigning our equipment since 2020, and we are on track to have all products complete and ready for purchase in advance of the January 1, 2025 transition date.

Given that R-454B is such a close match to R-410A, this will help limit the level of system of component redesign required. In fact, to the contractor, the look and feel of our R-454B systems will be similar to that of R-410A.

There will be some changes though. Components like compressors and filter driers are being rated and sized for R-454B, just like with any other refrigerant. R-454B systems will have additional labels, required by safety standards, to indicate the use of a flammable refrigerant. Some units will also include refrigerant leak detection and control systems for fan operation.



VIDEO RESOURCES

Join NGH experts as they discuss the upcoming A2L changes and the implications they have for the industry, distributors, contractors, homeowners and NGH products. Click on the links or scan the QR code to watch our videos. For the latest content, don't forget to follow NGH on YouTube!



“THE MORE YOU KNOW” WITH MATT LATTANZI

Matt Lattanzi, NGH's Vice President of Research and Innovation, shares his wealth of industry knowledge and experience with distributors, contractors, and the industry so they can be prepared for the upcoming A2L change.

The Benefits of R-454B

What Is an A2L Refrigerant?

What Is Global Warming Potential (GWP)?

Things to Know About the R-454B Refrigerant Transition

What Makes the Switch to R-454B Refrigerant Unique?

The Similarities Between R-410A and R-454B

2024 UL Safety Standard Changes

The Move to A2L Refrigerants

“THE MORE YOU KNOW” WITH BEN RANSOM

Ben Ransom, Director of Quality, outlines how as an NGH customer, you have a competitive advantage with the A2L change due to our leading coil technology.

NGH Coils, Your A2L Advantage

Benefits of NGH Coils with the A2L Change

A2L EDGETEK CONTRACTOR TIPS

Contractors who need knowledge about the A2L change should check out our latest Edgetek tip series! This short tips outline important things to know when working with A2L systems

What is an A2L?

Talking to Homeowners About A2L

What Is R-454B?

A2L Changes to Rules and Regulations

A2L Sensor 101

A2L Leak Mitigation Process

A2L Brazing Procedures

A2L Install Considerations

TRAINING

You have questions about the upcoming A2L changes, and we have answers. From interactive Lunch and Learns to updated training materials, NGH is here to answer all of your questions about the upcoming switch to A2L refrigerants.

SPRING 2024 LUNCH AND LEARN SERIES

AN OVERVIEW OF A2LS - MARCH 6, 2024

Dan Ayres, Product Manager, and Aaron Embry, Senior Director of Engineering discuss A2L refrigerants and their implications for the HVAC industry.

[WATCH THE BROADCAST](#)

PRODUCT CHANGES WITH A2LS - APRIL 17, 2024

Join Dan Ayres, Product Manager, and Aaron Embry, Senior Director of Engineer, as they discuss what product changes you can expect with the A2L refrigerant change.

[WATCH THE BROADCAST](#)

A2L DISCUSSION WITH COPELAND - MAY 7, 2024

The A2L change has far-reaching implications for all facets of the HVAC industry, including component suppliers. Join us as we walk through the process one of these suppliers, Copeland, went through as they prepared for the A2L refrigerant transition.

[WATCH THE BROADCAST](#)

**SCAN THE QR CODE TO REGISTER
FOR THE UPCOMING LUNCH AND
LEARN**



SUMMER 2024 PRODUCT CHANGE WEBINAR

UPCOMING NGH PRODUCT CHANGES - JULY 30, 2024

The time to place product orders is right around the corner! Join our panel of experts as they go over upcoming changes to NGH products (both residential and manufactured housing).

WATCH THE BROADCAST

FALL 2024 LUNCH AND LEARN SERIES

Information coming soon!



FAQs

EQUIPMENT

Will there be changes to the fan motor?

No, there will not be changes to the fan motor.

Will NGH have A2L heat pumps?

Yes, we will have R-454B heat pumps.

When installing an A2L condenser, will I need to replace the air handler?

Currently, yes. An A2L-certified air handler will be required for use with an A2L outdoor system.

Will units be factory charged?

Yes, NGH systems will be factory-charged (as they are today). We will not be supplying dry-shipped R-410A condensing units.

Do suppliers need new hazard material signs?

A2L equipment will include a flammability hazard sign.

Is there a TXV in A2L equipment?

Yes, NGH will use TXVs in select applications. TXVs are specific to the refrigerant used. You cannot use an R-410A TXV on an R-454B system or vice versa.

Are Micro-Channel coils an advantage with the switch to A2L refrigerants?

Yes, Micro-Channel coils offer several advantages with the switch to A2L refrigerants. Since these coils use less refrigerant, they are more likely to fall under that 4lb threshold and not require leak mitigation. Additionally, because they use less refrigerant, it can result in a lower cost to the homeowner, and there is less refrigerant to mitigate while servicing the unit.

Can I use an NGH evaporator with another manufacturer's furnace?

Yes, if installed and wired per our instructions, you can place one of our cased coils on another OEM's furnace. Our RDS will activate the blower in the furnace via the "Y" thermostat call.

Can I put someone else's R-454B indoor coil on your furnace?

The OEM producing the indoor coil is responsible for leak mitigation, so while it's likely other OEMs have

made provision for “mix-match” evaporators and furnaces you need to check the installation instructions of the indoor coil. When mixing equipment manufacturers in an A2L installation, it’s very important that you understand how the RDS works in the indoor coil and how the blower is activated in the furnace.

Is the sensor the only part of the system that’s important for A2L safety?

No, the location and sensitivity of the sensor are based on the details of the inside of the system. You may find additional sheet metal parts that are designed to direct a potential leak to an area where the sensor can detect it. You’ll also find enclosures in the system that have additional ventilation. This is to allow the circulating blower to clear these areas if a leak occurs. Certain electrical components may also have an A2L-safe rating they didn’t have before. For this reason, it’s very important to consult the replacement parts list when replacing something. A generic replacement may not be appropriate in an A2L application.

With the increased use of refrigerant press settings, will coil and condenser connections still come with swaged ends or straight tubing?

Coil and condenser fittings will be the same as they are today.

Will there be a cooling BTU difference between A2L and R-410A units?

A2L unit capacities will be very similar to their R-410A equivalent.

Will air handlers be multi-poise?

Yes, air handlers will be four-way multi-poise as they are today.

Will TXVs be mandatory, or will pistons be available?

We have expanded our use of TXVs. Now, all air handlers will use a TXV. Outdoor heat pumps will continue to use orifices in heating mode.

How will these units perform in cold climates?

Cold climate performance will be equivalent to our R-410A models.

Will NGH mini-splits use R-454B refrigerant?

No, mini-splits will use R-32. All NGH-manufactured equipment will use R-454B, while buy-resell products (like mini-splits) will use R-32.

Will uncased coils still be available?

Yes, uncased coils will be available for manufactured housing applications in which a furnace includes the coil cabinet. Uncased coils will also be available for replacements.

REFRIGERANTS

What are A2L refrigerants?

Named for their ASHRAE safety classification, A2L refrigerants are characterized by mild flammability, low toxicity, and low Global Warming Potential (GWP).

Can I mix R-410A and R-454B refrigerants?

No, these two refrigerants should never be deliberately mixed in a system. Mixing refrigerants violates

EPA section 608 and the resulting performance will be unpredictable.

Are A2L refrigerants likely to cause a fire?

Despite their mildly flammable classification, A2L refrigerants are extremely hard to ignite. The amount of an A2L needed in the air to ignite is substantial and takes a tremendous amount of energy. Extensive testing with A2Ls and numerous heat sources - including cigarettes, lighters, power drills and various household appliances - has been done, and no heat source provided ignition.

If this new refrigerant is flammable, how does spreading that refrigerant through the house with the indoor blower actually help if there is a leak?

It all comes down to flammability. The fuel needs to be above a certain concentration (the LFL) to be ignited. There is a maximum amount of charge used in a system based on the volume of the area it serves. Due to our Micro-Channel coils, our systems have relatively low charge weights, making it unlikely that maximum charge weight will be an issue in residential applications. Our installation instructions will show you how to safely determine this minimum area, and it's important you understand it. There is an important note here. If the system has zoning dampers, they need to be configured to open completely during a leak to make sure we're achieving the appropriate dilution level.

What is R-454B made of?

R-454B is a combination of two refrigerants - 68.9% R-32 and 31.1% R-1234yf.

Can I charge an R-410A system with R-454B?

No, you cannot change the flammability classification of a system. R-410A systems were not designed to safely mitigate leaks. And you cannot simply add an A2L sensor to an R-410A evaporator. The location and set-point of the system are carefully selected by the manufacturer for the indoor coil.

Is R-454B the only A2L refrigerant option manufacturers will shift to under the new standards?

No. While most manufacturers have opted for R-454B, some have chosen R-32.

SENSOR & THE REFRIGERANT DETECTION SYSTEM (RDS)

What is the warranty process for the RDS or sensor?

The warranty process is the same as today. Should a sensor fail, a warranty claim can be processed.

Are there any blower failure concerns in the RDS?

In addition to starting the blower during a leak, the RDS will prevent heat sources from operating (both gas and/or electric). The sensor has a self-check system that will disable heating and cooling if the sensor is not functional

Do you have to use an RDS if the factory charge is under 4 pounds?

No, factory-charged systems below 4lbs do not require leak mitigation.

Are sensors required when putting on an existing furnace?

Yes, a sensor is required when putting on an existing furnace.

Will the sensor be part of the coil?

Yes, the sensor will come with the indoor coil.

Can you retrofit the RDS?

If you're replacing a coil on a furnace, the new coil will have the RDS and no change to the furnace is required. For air handler applications, you will need a new A2L-certified air handler.

Will the sensor be in the cabinet for manufactured housing applications?

Yes, the sensor will be attached to the evaporator coil.

Will contractors have to braze within the cabinet on the evaporator coil to maintain the RDS?

Making the line set connection inside the cabinet is the preferred method for the RDS, however other options are detailed in our installation instructions.

In addition to the blower, will the RDS kill power to the entire system (e.g. humidifiers, UV lights, etc.)?

The leak detector will turn off any indoor heat (gas/electric) and the compressor. In addition, there is an alarm output that the technician can use to disable accessories.

PACKAGING, TRANSPORTATION & STORAGE

Do I need to do anything special to transport R-454B?

The U.S. Department of Transportation does not require special permitting as long as the charge weight of each system is under 26 lbs. So, not an issue for residential systems. Otherwise, technicians are already transporting flammable gases for their torches and the same precautions used there are appropriate for R-454B cylinders.

Do I need to do anything to my warehouse to store R-454B?

Possibly. As a flammable liquid, there are maximum allowable quantities that can be stored. Those quantities are based on the occupancy classification of your space and other details like your sprinkler system. Contacting your insurance company or local inspector is a good first step to making sure you're ready.

Will A2L stickers be used on equipment and packaging?

Yes, there will be warning stickers on the equipment and packaging.

How many drums of R-454B can be transported at a time?

Currently, there is no limit on the number of cylinders of R-454B that can be transported; however, always ensure they are secured properly during transport.

How will R-454B refrigerant be packaged?

Cylinders containing A2L refrigerants will have a red stripe.

INSTALLATION & SERVICE

Do I need to replace any of my service equipment to use R-454B?

For powered equipment, like pumps, check with the manufacturer for A2L compatibility. Passive tools, like gauges and hoses, probably do not need an A2L rating, but you should still have a set dedicated to R-454B to prevent cross contamination. Most A2L cylinders will have left-handed threads, so you may need adapters. Also, check with your manufacturer to ensure your leak sensor is appropriate for R-454B.

Do you need to flush an R-410A system and switch the unit to R-454B?

You cannot replace R-410A with R-454B in an existing system.

What kind of oil does R-454B use?

R-454B uses POE oil.

Can you use these systems as a drop-in replacement for R-410A?

You CANNOT replace R-410A with R-454B in an already installed system.

Will factory-charged condensers need to be purged?

No, the systems will be factory charged as they are today.

Will the furnace control boards have terminals to hook up the wiring from the coil sensor?

No, residential furnaces will not be changing.

Will NGH provide a tool to calculate the charge per cubic foot for R-454B systems?

The charge per cubic foot calculation will be represented as a table in our installation instructions.

Does this mean braze-free installations?

No, brazing is still considered the best type of joint from a leak mitigation standpoint.

Will there be a retrofit kit available for residential furnaces to activate the blower in the case of a leak event?

You will not need a retrofit kit in this circumstance for residential furnaces. The R-454B cased coil will include everything you need to use the furnace as the mitigation blower.

Do technicians need to get a new EPA license?

There is no new Section 608 license for R-454B.

What if I have more than one system in the home?

There are two possibilities there. You have two systems serving one volume, twinned systems. Or multiple systems serving different areas. For twinned systems, each system is considered individually, you don't add them together. So, each system individually must be under the maximum charge weight. For multiple systems serving different areas, the charge weight of each system is compared to the area it services. So, for an

upstairs/downstairs system, the area of the upstairs would be compared to the charge weight of that system. And this is where it's possible you might get close to that maximum charge weight value. Pay extra attention to systems that service a very small area like a bonus room or an enclosed porch.

Can refrigerant line sets from R-22 and R-410A systems be reused with R-454B, or should they be replaced when a new system is installed?

Yes, they can be reused if the line set is in good shape and properly sized for the system. As with any new installation, technicians should inspect the lines and follow local codes and manufacturer instructions for things like evacuation, pressure testing, and line set flushing. ASHRAE 15.2 dictates that line sets should be flushed and pressure tested.

Can I use mechanical joints (instead of brazing)?

Yes, if the joint method you're using is listed under UL 207 and installed per the manufacturer's requirements. If you're using an existing line set that has mechanical connections it may be difficult to establish that it meets this requirement.

Is the charging process any different?

No, you'll still be charging via superheat or subcooling depending on the expansion device. And as a 400 series refrigerant, it's important that you charge as a liquid, just like R-410A. If you're completely draining a system (to remove it for example) we recommend that you perform a nitrogen sweep to purge any refrigerant still captured in the system after your initial evacuation. Also, you're required to run nitrogen through a system if you're going to open it via unbrazing a joint.

Will line sets require a different kind of copper?

No, line sets will not require a different kind of copper.

Will contractors need to adjust how they perform cold weather repairs?

R-454B will behave similarly to R-410A during cold weather installations. Always be sure to follow our instructions on opening a system containing R-454B.

Will contractors need to be recertified for R-454B?

No, no new certifications are required.

Will older furnaces require a retrofit kit?

Retrofit kits are not required for residential applications; however, manufactured housing furnaces will require a retrofit kit.

Are the service valves on the outdoor unit a swage fitting, or will it be a copper tube size to allow for press-style fittings to avoid brazing?

The service valves have a swage and are the same as those used on R-410A systems.

What extra steps are being taken to ensure the safety of technicians when it comes to flammability?

Best practices today will continue to be best practices after the transition to A2Ls. Do not open a system with a torch without fully evacuating and sweeping with nitrogen. Do not smoke while working on a system.

Can you install an R-454B system in an attic or crawl space?

Yes, please see our installation instructions for details.

How do contractors reclaim R-454B refrigerant?

The reclaim procedure is the same as R-410A; however, be sure to use a reclaim system rated for A2Ls and an R-454B refrigerant tank. Please note that A2L tanks will have left-handed threads.

Will the installation instructions show how to calculate the lower flammability limit for a space?

Yes, our installation instructions will show how to calculate the lower flammability limit.

Can you still weld in an attic or will smaller spaces have to switch to press fittings?

Brazes are still considered the best joints from a leak mitigation standpoint. Our installation instructions will include guidance related to the max refrigerant charge and the size of the structure.

Will R-454B installations require a line set change?

NGH recommends using 5/8ths line sets in more cases to ensure good oil return. You can find more information in our technical literature, which will be available once products are ready to order.

GENERAL KNOWLEDGE

In the case of a leak, is R-454B toxic to the homeowner?

No, R-454B is an A2L refrigerant. The "A" in "A2L" indicates that the refrigerant is non-toxic.

Will there be training for contractors? If so, where can I find it?

NGH training materials will be updated to reflect product changes related to A2L refrigerants. Additionally, there are numerous industry resources available for contractors. For links to a couple of these organizations, visit the A2L landing page (www.nortekhv.com/a2l-refrigerant-change).

What will NGH do to help distributors prepare?

First, we will have the products for the transition ready well in advance of January 1, 2025. We will also be supplying general knowledge about the transition starting in 2024. You can expect to see a variety of education opportunities throughout the year, including new product literature, homeowner literature, webinars, live demos, training videos, in-person training where appropriate, FAQs and more. We will start with general knowledge about the transition and R-454B and then move to more specific product training as we near the transition date.

What is the Quality Pledge procedure on all remaining R-410A systems with the new A2L equipment?

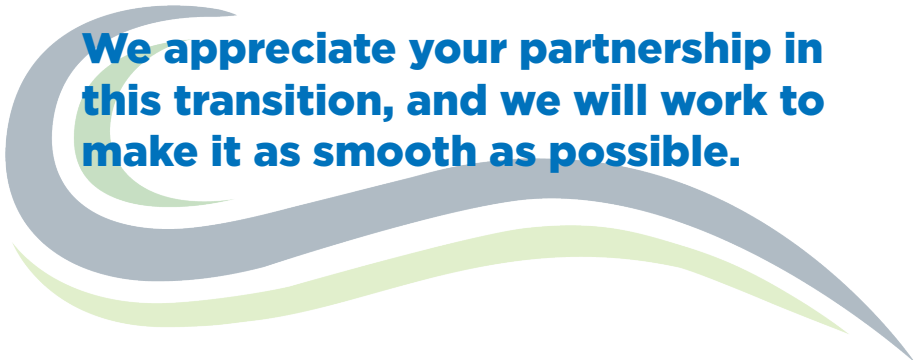
The Quality Pledge procedure will remain the same with the new A2L equipment. Per our warranty documentation, if your outdoor equipment is no longer available due to changes in government regulations, technology, or refrigerant, we will provide the latest equipment available. However, the latest equipment available may require changes to or replacement of the indoor evaporator coil and/or the connecting line set. All necessary changes or replacements of the indoor equipment or line set are the responsibility of the homeowner. In lieu of changing or replacing the evaporator coil and/or the connecting line set, the homeowner can elect to receive a new compressor.

When will NGH have product available for the market?

NGH has been in the process of redesigning equipment since 2020 and are on track to have all products complete and ready for purchase in advance of the January 1, 2025 transition date. We will continue to monitor all EPA/DOE rulings to give an official launch date in early 2024, but customers can expect all products to be available for purchase in the back half of 2024. We look forward to working with our customers on appropriate transition plans.

When will we get product literature?

Product literature will be available prior to the launch of equipment during the back half of 2024. Please check back for exact dates.



We appreciate your partnership in this transition, and we will work to make it as smooth as possible.

