R-454B
Frequently Asked Questions

Johnson Controls

Notice
The intended audience for this document is end-users, homeowners, business owners, etc. The purpose of this document is to provide information in a plain-language, Q&A format about refrigerant R-454B used in A/C and heat pump systems. The information in this document is supplemental and does not replace that of the product-specific Installation Manual or User Information Manual.

Refrigerant R-454B or R-454B	The generic name R-454B is the industry designation that describes the composition of the refrigerant. R-454B is a low global warming potential (low GWP) refrigerant for use in A/C and heat pump systems. Widespread use of refrigerant R-454B begins in 2024.

Q	A
What is refrigerant?	Often referred to as “Freon” (a trade name of early refrigerants), the refrigerant is the fluid that circulates within the piping and components of your A/C or heat pump system.
What does refrigerant do?	Working with other parts of your system, the refrigerant carries the heat through the system. For cooling, the refrigerant picks up the heat from indoors then moves the heat outdoors to be disposed. For heat pump heating, the refrigerant grabs the heat from outdoors and moves the heat indoors.
What makes refrigerant so special?	Refrigerant is a substance that must comply with environmental regulations for ozone depletion and global warming. Performance, toxicity and flammability are the other primary factors that contribute to selection of the refrigerant used in your system. Ozone Depletion Regulations: As has been required of the refrigerant used in new A/C or heat pump systems beginning in the 1990s, R-454B is rated at zero potential for ozone depletion. Global Warming (“Greenhouse Gas”) Regulations: New A/C or heat pump systems manufactured after 12/31/2024 must use a refrigerant that is rated at low potential for global warming (low GWP). Systems using higher GWP refrigerant cannot be sold after 12/31/2025. In anticipation of these deadlines, systems using the low GWP refrigerant R-454B will be phased into the market. Performance: Your system utilizes precise design, available components and technology to deliver the capacity and efficiency needed for comfort. The refrigerant needs to work well throughout the range of operating conditions and be compatible with the other components of your system. Toxicity: As have the refrigerants commonly used in A/C or heat pump systems for the last 90+ years, R-454B is rated as non-toxic. Flammability: The low GWP refrigerant R-454B used in your system is described as “mildly flammable”, unlike earlier ozone depleting and/or higher global warming refrigerants that were rated as non-flammable. The refrigerants currently available for A/C or heat pump systems to meet low GWP requirements introduce some toxicity or flammability concerns. R-454B was seen as the best low GWP refrigerant choice to utilize in your system’s design because it is non-toxic and has more favorable flammability characteristics.

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What about the safety of a systems with a “mildly flammable” refrigerant?	There is renewed emphasis on periodic maintenance and professional service of you’re A/C or heat pump system. These checks are to ensure the protective features used with refrigerant R-454B remain in working order as well as to help keep your system functioning reliably. Refrigerant, mechanical and electrical safety aspects of your system are addressed in multiple ways: ▪ The system is manufactured to the latest requirements for safety. ▪ Building codes set safety standards for the installation of the system. ▪ Through training and certification, technicians are informed of the best safety practices for installation and service of the system.
What about leaks with a “mildly flammable” refrigerant?	Normally, the refrigerant is sealed within the metal piping and components of your system. There is no air or oxygen available to support combustion in this sealed environment. Refrigerant leaks are abnormal and produce a mixture of air and R-454B. Often, leaks are tiny with very small amounts of refrigerant released over time. Because of rapid refrigerant release, breakage or puncture leaks elevate concerns about the concentration of R-454B mixed with air. Safety standards and protective features used in your system center on the concentration of refrigerant R-454B mixed with air due to leaks: When the amount of refrigerant in the system is small enough and the system is located in a large enough area – it is not possible for leaks to produce a concentration of refrigerant R-454B in the air that reaches the threshold of a combustible mixture; refrigerant detection sensors are optional. When the amount of refrigerant in the system is large enough and the system is located in a small enough area – there is potential for leaks to produce a concentration of refrigerant R-454B in the air that reaches the threshold of a combustible mixture; refrigerant detection sensor(s) are required; either built-in by the manufacturer or added to the system during installation. If a sensor detects a concentration of refrigerant R-454B in the air that is four times below the threshold of a combustible mixture – the system’s fan operates to disperse the refrigerant (local building codes may require additional response to refrigerant leak detection).
What should I do if my system has a large refrigerant leak?	1. Extinguish open flames and remove/turn off anything in the area that could be an ignition source. 2. Ventilate the area, pay care to low spots since refrigerant is heavier than air. 3. Contact your servicing HVAC contractor to make repairs.
If refrigerant R-454B ignites, how is the flame extinguished?	First, assess your safety and dial 911 before attempting to extinguish any fire in your home or business. The recommendation is a dry-chemical, Class A-B-C fire extinguisher be used if there is a fire in or around your system. Class A-B-C fire extinguishers are rated for use on solid material, flammable gas and electrical fires.
Can refrigerant R-454B explode?	Refrigerant R-454B is a relatively poor fuel and does not burn energetically; it is very unlikely that a combustible mixture of air and R-454B will explode.

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Q How does refrigerant R-454B compare to other combustible materials?

A

To be relatable, the flammability characteristics, 70% isopropyl rubbing alcohol and refrigerant R-454B are compared. 70% isopropyl rubbing alcohol is a familiar substance commonly used for first aid disinfection, in moist wipes, etc.

The vapor from both 70% isopropyl rubbing alcohol and R-454B is about 2 times heavier than air.

A standardized rating describes a concentration percentage range, by volume, where the amount of a material's vapor mixed in the air is considered combustible. Generally, lower concentration percentage ratings indicate it is easier to create conditions where the material is combustible. 70% isopropyl rubbing alcohol is rated to be combustible in concentrations from 2% to 12.7%. Refrigerant R-454B is rated to be combustible in concentrations from 11.25% to 22%.

The higher the ignition temperature, the more difficult it is to ignite a combustible mixture of a material's vapor and air. 70% isopropyl rubbing alcohol is rated at an ignition temperature of 750°F (399°C) – a low enough temperature to be ignited by static electricity, toasters, etc.

The heat content and flame velocity are two ways to describe how energetically a material burns. When burned 70% isopropyl rubbing alcohol has 3 times the heat content of R-454B. At two inches per second, the flame velocity of R-454B is about 8 times slower than 70% isopropyl rubbing alcohol.