R32

R-32 REFRIGERANT:
GET THE FACTS

DAIKIN

Amana Heating & Air Conditioning

Goodman Air Conditioning & Heating

Daikin is committed to providing stakeholders the facts about low-GWP R-32 so they can make the right choice when replacing existing residential and commercial R-410A systems. This content is intended for technical, training, and contractor HVAC audiences. **IMPORTANT NOTE:** All A2L systems must follow manufacturers' installation guidelines during the installation process.

Since 2012, R-32 has been widely adopted as a low-GWP refrigerant, with over 280 million units installed across 130 countries. Manufactured by numerous producers, R-32 is available and affordable.

As a ***proven***, ***simple***, and ***available*** non-proprietary alternative to R-410A, R-32 continues to be a reliable choice for global refrigeration needs. Get the facts around R-32...

YOU MAY HAVE HEARD: R-32 and R-454B have similar charge requirements.

GET THE FACTS:

When comparing base efficiency residential single stage 3-ton split system heat pumps, the factory charge of Daikin's R-32 system can require less refrigerant charge than the competing systems identified below:

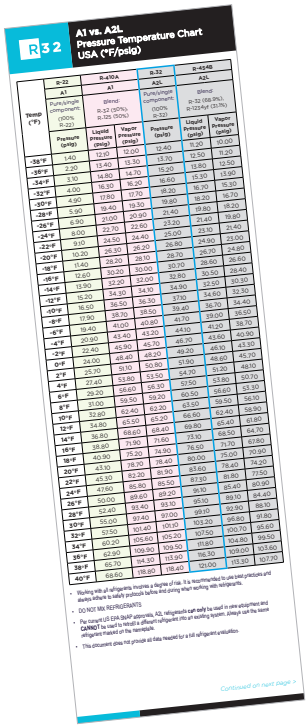
REFRIGERANT QTY FOR SINGLE STAGE 3 TON HEAT PUMP:		
BRAND	**REFRIGERANT TYPE**	**REFRIGERANT AMOUNT**
DAIKIN *(DH4SQA3610)*	R-32	82.6 oz.
CARRIER *(27SCA536A003)*	R-454B	121.6 oz.
LENNOX *(ML14KP1036230)*	R-454B	114 oz.
TRANE *(5TWR5036A1000A)*	R-454B	90 oz.
RHEEM *(WP14AY36A)*	R-454B	94 oz.

A lower charge size can help with managing refrigerant inventory, mitigating accidental releases, streamlining refrigerant logistics, and controlling refrigerant costs.

YOU MAY HAVE HEARD: That R-32 operates at a slightly higher pressure than R-410A.

GET THE FACTS:

R-32 has slightly higher cycle pressures than R-410A, however, our R-32 systems have undergone rigorous testing to ensure reliable system operation. Daikin, Amana® brand, and Goodman brand R-32 systems have been designed and optimized to assure high levels of reliability and performance, while providing outstanding limited warranties* and customer satisfaction. Daikin engineers have optimized refrigerant systems to effectively overcome the increased operating pressure. Each component has been methodically selected, sized, and qualified to support operational characteristics prescribed by the component suppliers and maintain the spectrum of operating conditions like R-410A products. R-32 has been proven, as R-32 refrigerant systems have been in full production since 2012, and over 280 million units have been installed around the world and is used in over 130 countries around the world.



R32 A1 vs. A2L Pressure Temperature Chart USA (°F/psig)

Temp (°F)	R-22 A1 Pure/single component (100% R-22)	R-410A A1 Blend: R-32 (50%), R-125 (50%)		R-32 A2L Pure/single component (100% R-32)	R-454B A2L Blend: R-32 (68.9%), R-1234yf (31.1%)	
	Pressure (psig)	Liquid Pressure (psig)	Vapor Pressure (psig)	Pressure (psig)	Liquid Pressure (psig)	Vapor Pressure (psig)
-58°F	1.40	12.10	12.00	12.40	11.20	11.00
-56°F	2.20	13.40	13.30	13.70	12.50	12.30
-54°F	3.10	14.80	14.70	15.20	13.80	13.60
-52°F	4.00	16.30	16.20	16.80	15.30	15.10
-50°F	4.90	17.80	17.70	18.30	16.70	16.50
-48°F	5.90	19.40	19.30	19.80	18.20	18.00
-46°F	6.90	21.00	20.90	21.40	19.80	19.60
-44°F	8.00	22.70	22.60	23.20	21.40	21.40
-42°F	9.10	24.50	24.40	25.00	23.10	21.40
-40°F	10.30	26.30	26.20	26.90	24.90	23.00
-38°F	11.40	28.20	28.10	28.70	26.70	24.80
-36°F	12.60	30.20	30.00	30.70	28.60	26.60
-34°F	13.90	32.20	32.00	32.80	30.50	28.40
-32°F	15.20	34.30	34.10	34.90	32.50	30.30
-30°F	16.50	36.50	36.30	37.10	34.60	32.30
-28°F	17.90	38.70	38.50	39.40	36.70	34.40
-26°F	19.40	41.00	40.80	41.70	39.00	36.60
-24°F	20.90	43.40	43.20	44.00	41.40	38.70
-22°F	22.40	45.90	45.70	46.70	43.80	40.90
-20°F	24.00	48.40	48.20	49.20	46.30	43.20
-18°F	25.70	51.10	50.80	51.90	48.60	45.50
-16°F	27.40	53.80	53.50	54.70	51.20	47.90
-14°F	29.20	56.60	56.30	57.50	53.80	50.30
-12°F	31.00	59.50	59.20	60.50	56.60	52.80
-10°F	32.80	62.40	62.20	63.50	59.50	55.40
-8°F	34.80	65.50	65.20	66.80	62.40	58.00
-6°F	36.80	68.60	68.40	69.80	65.40	61.00
-4°F	38.80	71.90	71.60	73.10	68.50	64.70
-2°F	40.90	75.20	74.90	76.50	71.70	67.60
0°F	43.10	78.70	78.40	80.00	75.00	70.20
2°F	45.30	82.30	81.90	83.60	78.40	73.50
4°F	47.60	85.80	85.50	87.30	81.80	76.80
6°F	50.00	89.60	89.20	91.10	85.40	80.30
8°F	52.40	93.50	93.10	95.10	89.10	83.40
10°F	55.00	97.40	97.00	99.10	92.90	86.90
12°F	57.50	101.40	101.0	103.20	96.80	90.60
14°F	60.20	105.60	105.20	107.50	100.70	94.30
16°F	62.90	109.90	109.50	111.80	104.80	98.00
18°F	65.70	114.30	113.90	116.30	109.00	101.90
20°F	68.60	118.80	118.40	120.90	113.30	105.90

- Working with all refrigerants involves a degree of risk. It is recommended to use best practices and always adhere to safety protocols before and during their working with refrigerants.
- DO NOT MIX REFRIGERANTS.
- Per current US EPA SNAP approvals, A2L refrigerants can only be used in new equipment and CANNOT be used to retrofit a different refrigerant into an existing system. Always use the name refrigerant marked on the nameplate.
- This document does not provide all data required for a full refrigerant evaluation.

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SCAN TO DOWNLOAD THE A1 VS. A2L PRESSURE TEMPERATURE CHART

*Complete warranty details available from your local dealer/contractor or the brand websites: www.daikincomfort.com / www.amana-hac.com / www.goodmanmfg.com

YOU MAY HAVE HEARD: R-32 systems have a reduced operating envelope due to a higher discharge temperature (compared to R-454B and R-410A).

GET THE FACTS:

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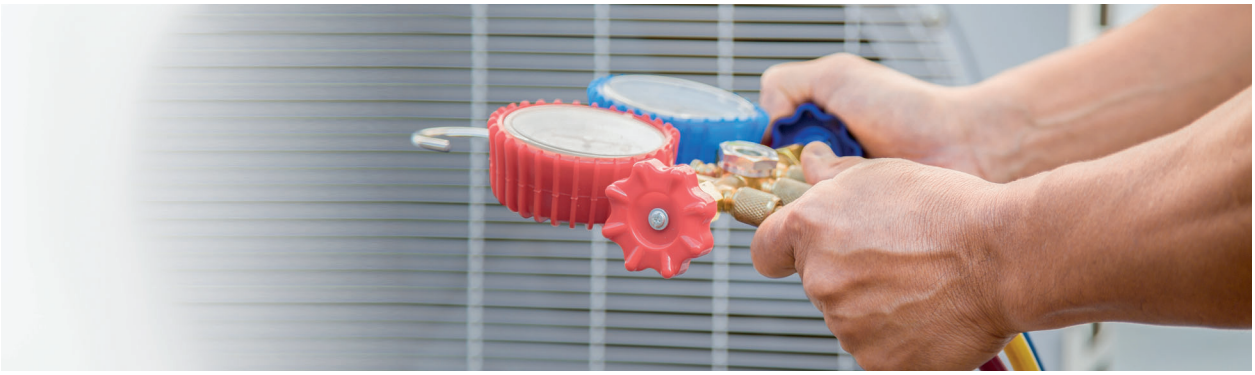
Daikin, Amana brand, and Goodman brand R-32 system components such as compressors, heat exchangers, and expansion devices have been robustly designed, optimized, and thoroughly tested to maintain a reliable operating envelope like the R-410A systems. Daikin engineers optimized the system design through enhanced superheat control by TXV tuning, refrigerant charge optimization, proper heat exchanger sizing, and worked with compressor manufacturers for improved compressor designs and tuned-in oil formulation for superheat control. These designs have been tested at Daikin for reliable operation of the system over its operating envelope. Once again, over 280 million R-32 systems installed around the world are a testament to a high-level of customer comfort, satisfaction, and proven performance.

YOU MAY HAVE HEARD: R-32 requires newly formulated Poly Olester Oil (POE) while R-454B can use the existing R-410A POE oil.

GET THE FACTS:

Yes, R-32 refrigerant systems use a new POE (Poly Olester Oil) and/or PVE (Poly Vinyl Ether) oil that have been proven in a variety of applications for more than a decade. The oil formulations have been optimized to provide outstanding lubrication characteristics and oil-refrigerant mixture properties. All R-32 systems have been tested with this new POE/PVE oil and verified for reliable operation in all ambient conditions like that of R-410A. All R-32 components such as compressors, expansion device and other components were tested with the new formulated oil.



YOU MAY HAVE HEARD: R-32 provides similar installation benefits to its predecessor R-410A and another new A2L known as R-454B, both blended refrigerants.

GET THE FACTS:

1. **R-32 refrigerant, as a single component,** can provide some significant advantages over the blended alternative R-454B and the previous R-410A refrigerant. Because R-32 is a single component refrigerant, it can be topped off in liquid and gas form without changes in composition.
2. As shown in the table on the following page, R-32 has a **higher latent heat of vaporization** when compared with R-454B, this means R-32 can absorb more heat during evaporation. This in turn means for a given mass flow rate, R32 can transfer more heat, allowing for a lower refrigerant mass flow rate needed to achieve the same capacity.
3. R-32 systems are compact, lightweight, and efficient. R-32 has excellent **thermal conductivity** and **specific heat properties** (see table below), which means R-32 can efficiently transfer heat in evaporators and condensers. When compared to R-410A and R-454B, the higher specific heat properties of R-32 allow it to absorb more sensible heat per unit mass as it passes through the evaporator and condenser for outstanding heat transfer efficiency of R-32. This has allowed Daikin's engineers to develop many R-32 systems that use a smaller size heat exchanger when compared to their equivalent efficiency Daikin R-410A predecessor system. Contractors may benefit from a small size heat exchanger throughout installation, delivery, and storage logistics.

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YOU MAY HAVE HEARD: *(continued from previous page)*

4. R-32 is a single component refrigerant with no **temperature glide**. Being a single component, R-32 systems can be topped off in either liquid or gas phase, without a change in composition within the system. On the contrary, simply topping off a blended refrigerant, such as R-454B and R-410A, can lead to **capacity loss** due to varying blend refrigerant composition. With blends, like R-454B or R-410A, it is **generally not recommended** to top off; the system **must** be evacuated and then recharged with new refrigerant to ensure refrigerant composition and optimum system performance, as well as accurate superheat and sub-cooling parameters.

The table^ below shows the difference between key properties of R-410A, R-32, and R-454B.

PROPERTIES	R-410A	R-32	R-454B	MEANING
Thermal conductivity (W/mK) at 25°C Liquid **Thermal conductivity** (W/mK) Vapor at 1.013 bar	0.0892 0.0133	**0.1259** **0.0125**	0.1055 0.0130	*R-32 has better heat exchanger efficiency.*
Temperature glide (K)	0.1	**0**	1.5	*Varying boiling point of composition in a mixture.*
Latent heat of vaporization at boiling point (kJ/kg)	273	**382**	316	*R-32 absorbs more heat during phase change.*
Specific heat (kJ/ (kg K)) at 25°C Liquid **Specific heat** (kJ/ (kg K)) Vapor at 1.013 bar	1.7082 0.8231	**1.9367** **0.8476**	1.7990 0.8650	*R-32 refrigerant can store more energy per unit mass.*

^Reference: Refprop 10

At the date of this publication, R-32, a single component refrigerant, is less expensive++ than R-454B. R-32 products are already produced in large volumes by over 50 manufacturers worldwide, it is non-proprietary, and readily available.

++ Price comparison sourced from eRefrigerants.com on 06/03/2025.

PROVEN. EASY. AVAILABLE. EFFICIENT.

SCAN TO DISCOVER THE R-32 RESOURCE PORTAL.

IMPORTANT NOTE: All A2L systems must follow manufacturers' installation guidelines during the installation process.

ADDITIONAL INFORMATION

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

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