



Will Forane® 427A perform as well as R-22?

Yes, in many systems. The capacity loss with Forane® 427A is approximately 3% @ 45°F evaporator temperature. This is not noticeable in most systems that are currently running correctly and designed properly.

Will my efficiency decrease using Forane® 427A?

You may lose some efficiency. The efficiency loss of Forane® 427A at 45°F evaporator temperature can be 3%. Systems that are not running or sized correctly could see additional losses.

Will I have to change the oil?

No, not in many installations. Forane® 427A is compatible with MO/AB & POE. However, R-22 is both compatible and miscible with MO, AB, & POE. Although Forane® 427A is formulated to be highly tolerant of MO/AB, installations with complex piping layouts or vertical risers could prove challenging for proper oil return. In addition, in systems utilizing a receiver and/or accumulator, adding up to 20% POE or changing to POE completely is recommended. Consult Arkema's technical support department for additional guidance.

Can I mix Forane® 427A and R-22?

Mixing refrigerants is not recommended as it creates a new refrigerant that is not EPA approved. In addition, it contaminates the R-22. Proper calculation of superheat and subcooling becomes extremely difficult, which could result in damaging the compressor.

What happens if R-22 is mixed with Forane® 427A?

It is possible that no noticeable performance differences will occur. However, you should not mix refrigerants for the reasons noted above.

Can I top off with Forane® 427A?

Yes, you can top off with liquid Forane® 427A if the system has already been retrofitted with Forane® 427A and leaks occur. The charge should be within specification. If a large portion of the charge has leaked, it is best to recover the remaining charge and weigh in a new charge.

Can I charge vapor?

No. Forane® 427A is a blended refrigerant. All blended refrigerants should be charged as a liquid. Charging in the liquid phase will limit fractionation. Disposable cylinders do not come with dip tubes, therefore, the cylinder will need to be turned upside down.

Is R-407C a better refrigerant?

R-407C capacity, efficiency, and mass flow rates may be slightly closer to R-22 than Forane® 427A in typical AC applications. A trade-off, however, is that R-407C is not formulated to work with MO/AB and requires POE oil. Also, the discharge pressures could be 15 to 25 psi higher than R-22. Forane® 427A discharge pressure is typically only 0 to 10 psi higher than R-22. Consult Arkema's Retrofitting with Forane® Refrigerants Quick Reference Guide.

Will I have to change my expansion device?

The mass flow rate of Forane® 427A is about 4% greater than R-22. Rarely does such a small increase require a modification of the expansion device.

What else do I need to know?

R-22 is an excellent refrigerant, especially at high ambient conditions. However, it is also an ozone depleting substance, which is being phased out. The EPA-approved alternative gases do not have the same solvency with MO/AB nor do all compressors have the same suction velocity to circulate oil properly through the system. Oil quality and solvency could impact oil return. R-22 systems that were not correctly designed or systems that are not running well on R-22 will likely not run any better using another refrigerant. Care must be taken to evaluate each system before retrofitting.

What to expect after retrofitting?

Typically expect 0 – 5 psi lower on the suction and 0 – 10 psi higher on the discharge. Superheat and subcooling will typically be lower than R-22. Pressures could be higher due to ambient conditions.

RETROFIT CHECKLIST

- Record how the system is running on R-22. If the system is not running, determine a target superheat/subcooling, air temperature drop, and AMP draw. Example: How should the system run on R-22? What would the pressure/temperatures, superheat/subcooling, and AMP draw be if the system were running on R-22? See note*
- Recover the R-22 charge.
- Determine if changing or adding POE oil is needed. See note**
- Check oil quality for contamination and/or acidity.
- Install new filter dryer then leak check system. See note***
- Replace rubber and neoprene external seals and gaskets. See note****
- Charge 90% liquid of the original R-22 charge and let the system run for 20 minutes.
- Add liquid refrigerant to attain target superheat/subcooling.

Different systems, different compressors, and the age/condition of the installation could all impact performance when transitioning to another refrigerant. Poor airflow and design load could also impact performance. Be aware of these conditions before retrofitting. Systems that are not running properly on R-22 most likely not perform any better with another refrigerant.

NOTES

* Forane® 427A is intended as a retrofit in systems originally designed for R-22. Therefore, how the system was running on R-22 will be a guide or target for how the system should run on R-427A. Compared to R-22, expect 0-5 psi lower on the suction side and 0-10 psi higher on the discharge. It could be higher on high load/high ambient days.

** Forane® 427A is compatible with MO/AB. However, unlike R-22, it is not completely miscible (ability to form one solution). Therefore, it is recommended to either convert 20% of the oil to POE or change over to POE completely, where circumstances warrant. Oil return could be inhibited in systems with long complex line sets and risers feeding compressor located > 5' above the evaporator. Tandem compressors without oil separators and chillers with large diameter suction lines will require a complete change to POE to assure proper oil return. Layering of liquid oil and liquid refrigerant might occur in receivers, which could prove problematic for oil return. Poor oil quality could also affect oil return and cause damage to the system. Contaminated systems should be flushed, and oil replaced with new POE. Below is a guide to when you should be concerned with oil return using MO/AB with R-427A. Be aware that compressor age, type, and condition could also impact oil return. Trane 3-D, Danfoss SM and all screw compressors will require a complete oil change to POE.

*** If you add or change over to POE, you must install a new filter dryer. POE will act like a solvent and loosen dirt/grime within the system. POE oil is also hygroscopic. Pulling deep vacuums to 500 microns and installing new filter dryers are highly recommended.

**** Elastomeric seals can swell as a result of absorbing refrigerant. Different materials (different refrigerants) can be absorbed at different rates or to different amounts, and the extent of swelling will be different. The swelling is taken into account during the design of HVAC systems. HCFC refrigerants, like R-22, have chlorine. By their nature, chlorinated refrigerants will be more easily absorbed by elastomer materials than non-chlorinated refrigerants like (HFC) R- 427A. The seals/gaskets will not swell as much compared to R-22. Additionally, pulling a vacuum could further deform the seal. Arkema recommends replacing seals and gaskets, when retrofitting any R-22 system. In many HVAC systems, the Schrader core is the only external seal that needs to be replaced.

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