

## **“Why can’t I put R32 refrigerant in equipment designed to use R410A”?**

The quick and easy answer would be “because the manufacturer said so” but that sounds too much like what my parents used to tell me when I would question something, so here is some actual answers.

R410A systems are designed with specific components and safety factors based on the properties of R410A. Retrofitting these systems for R32 would require extensive modifications and validation to ensure safety and performance, which is generally not recommended or cost-effective.

Systems designed for use with R32 have different pressure switch regimes, altered inverter profiles, and specially designed heat exchangers.

R32 is slightly flammable, while R410A is not, and R410A systems are not designed to handle flammable refrigerants. Introducing R32 into a R410A system could create a safety hazard in the event of a leak.

**R32 has different boiling points, pressures, and other thermodynamic properties** compared to R410A that can lead to reduced efficiency and increased wear on system components like the compressor.

R410A systems are not built to handle the higher pressures of R32, and forcing R32 into such a system could damage components like the expansion valve.

R32 is not as miscible with the POE (Polyolester) oil typically used in R410A systems. This lack of miscibility can lead to lubrication issues, further contributing to compressor wear and potential failure.

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Daikin uses Polyvinyl ether (PVE) with their ductless systems. PVE oil is great for our systems considering that we do not use filter dryers. There is no need for a dryer if the system is installed properly. PVE oil is compatible with all HFC refrigerants, has good anti-wear properties and lubricity, and resists blockage in capillary tubes and metering devices.

Oddly enough, PVE oil is even **hygroscopic** (capable of easily absorbing moisture), once it attracts that moisture, it is easily removed since no hydrolysis takes place.

**R32 has a higher compressor discharge temperature than R410A.** It can exceed R410A discharge temperatures by as much as 29<sup>OF</sup> degrees. The higher discharge temperature is dealt with by cooling strategies or oil viscosity.

High discharge temperatures can lead to compressor overheating, wear and tear, and premature failure of the compressor in an R410A system not designed for it.

In summary, it is not good practice to charge a system with a refrigerant that the system was not originally designed to use without appropriate assessment of the differences in characteristics of the replacement gas.

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