Name:	**R-454B**
Name (2):	XL41 (Opteon)
Brand	Opteon (Chemours)
Classification:	HFOs
Chemistry:	HFO Blend: R-32 (68.9%) & R-1234yf (31.1%)
Chemistry (2):	**Click Here for R-32 Fact Sheet**
Chemistry (3):	**Click Here for R-1234yf Fact Sheet**
Status:	Active & Growing Market.
Future:	Set to Replace R-410A Applications
Application:	Residential & Commercial Air-Conditioning.
Application (2):	Heat Pumps & Chillers
Replacement For:	R-410A Puron
Retrofitting From R-410A?	No, New Machines Only.
Why Can't I Retrofit?	Due to 2L Flammability Rating.
Ozone Depletion Potential:	0
Global Warming Potential:	467 (78% Less Then R-410A)
Toxicity Levels:	A (No Toxicity Identified.)
Flammability Levels:	Class 2L - Lower Flammability
Lubricant Required:	POE
Boiling Point (101.3 kpa):	-50.9° Celsius or -59.62° Fahrenheit.
Temperature Glide	-1.5 K or -462.37 Fahrenheit
Critical Temperature:	77.11 Celsius or 170.60° Fahrenheit
Liquid Density (21.1 °C)	996.5 kg/m3 (62.2 lb/ft3)
Auto ignition Temperature:	Unknown (Couldn't Find)

Name:	R-454B
Burning Velocity (23 °C)	5.2 cm/s (2.0 in/s)
Molar Mass	111.8
Molecular Weight	62.6 g/mol
Manufacturers:	Chemours
Manufacturing Facilities:	United States (Texas)
Form:	Gas
Color:	Colorless Liquid & Vapor
Odor:	Slight, ether-like
EPA Certification Required:	Yes, 608 certification required by January 1st, 2018.
Require Certification to Purchase?	Yes, 608 certification required by January 1st, 2018.
Cylinder Color:	Undefined by ASHRAE
Safety Data Sheet (SDS)	**Click here (Sourced from Climalife.co.uk)**
Bulk Purchasing:	**CLICK FOR A QUOTE!**

Thoughts on R-454B

R-454B, or XL41, was invented and designed by the Chemours Company as an alternative to R-410A applications. These applications include your traditional home air conditioners, your commercial air conditioners, heat pumps, and the occasional chiller. XL41 is a blended HFO refrigerant is comprised of sixty-eight point nine percent R-32 and thirty-one point one percent R-1234yf.

One of the biggest attractions of R-454B is the savings in what's known as Global Warming Potential, or GWP. Every refrigerant out there rather it is a hundred years old or it was just invented yesterday has a GWP rating. GWP is a measurement on how potent a certain chemical is to the environment. The higher the GWP number the worse it is. Like with all scales, there needs to be a zeroing point. In this case the zero scale is Carbon Dioxide, or R-744. CO2 has a GWP number of one. As a comparison the commonly used R-410A refrigerant has a GWP of two-thousand and eighty-eight.

Looking at that number we can begin to see the problem with R-410A. It is directly contributing to Global Warming and Climate Change. The reason R-454B is being selected for newer applications is due to its much lower Global Warming Potential. 454B's GWP is four-hundred and sixty-seven. That is nearly an eighty percent decrease when compared to Puron. This impressive number puts it at the lowest GWP alternative to R-410A. To give you some perspective, the other contender as an R-410A replacement, R-32, has a GWP of six-hundred and seventy-five. R-454B is an additional thirty percent lower. Along with that, 454B has a zero Ozone Depletion Potential rating so there is no risk there either. It is a very healthy refrigerant for the environment.

R-454B, or XL41, is classified as a HydroFluroOlefin refrigerant. These types of refrigerants, known as HFOs, are known for a few things. The first is that they have significantly lower Global Warming Potential then the commonly used HFC refrigerants of today. This fact right here checks a lot of boxes for business owners and manufacturers and may be enough to get them on board. However, like with any refrigerant, there is always a downside. HFO refrigerants are also known for their flammability. It seems we never can truly 'win' with refrigerants. There are always Pros and Cons.

In the case of R-454B it is rated by ASHRAE as an A2L. The A rating is great as it indicates that the refrigerant is not toxic. Other refrigerants with this same ratings are R-22, R-134a, and R-410A. The problem though lies in the 2L rating. This indicates a lower flammability rating for R-454B. Most of the common HFC refrigerants that we handle today are rated as a 1 by ASHRAE. A 1 rated refrigerant indicates that there is no risk of flame propagation. A 2 rated refrigerant has a lower flammability rating. Now, a 2L rated refrigerant means that along with the lower flammability we also have a lower burning velocity. This 2L sits R-454B right in the middle of the flammability refrigerant scale. While HFCs are rated as a 1 other very flammable refrigerants like Propane (R-290) are rated at a 3.

While a flammable refrigerant may sound intimidating and dangerous we should mention that they are perfectly safe and are used every day throughout various Asian countries such as Japan and Korea. They do this daily and prevent accidents due to two major factors. The first is that they take the proper precautions when installing and handling flammable refrigerants. The second is routine maintenance. If you follow your training and ensure that everything is done by the book you'll be fine.

Regardless though, the thought of working with flammable refrigerant deters a lot of technicians and contractors from using these newer HFO refrigerants. Lastly, since R-454B has an increased flammability rating then R-410A you are NOT able to retrofit

existing 410A machines over to take R-454B. This is due to the specialized parts and components that a flammable refrigerant needs for it to work safely. If you wish to go with R-454B refrigerant you will need to purchase a whole new machine.

A few other notes worth sharing on R-454B:

- XL41/454B is rated as five percent more efficient then R-410A Puron.
- 454B offers the lowest GWP alternative to R-410A all without compromising on system performance.
- While retrofitting isn't possible, R-454B will not require major equipment modifications.

Conclusion

It is far too early to say rather or not R-454B will be the fabled R-410A killer or not. There are numerous alternatives out there that are all gaining traction. The question now though is will one of these began to gain speed over the others? Will companies around the globe began to pick one over the other? It may already be happening with R-454B. There are numerous articles and stories out there about companies moving away from R-410A and over to R-454B. Just a few of these companies are Carrier, York, and Johnson Controls. These are all huge names in the industry and may indicate a turning point.
But, as I said before folks, at this point it is still a guessing game. The true alternative for R-410A may have not even made it's debut yet. Time will only tell.

Thanks for reading,

Alec Johnson

RefrigerantHQ

Sources

- **Chemours.com – Official R-454B Page**
- **Chemours.com – Official R-454B Information Sheet**
- **Chemours.com – Official R-454B Safety Sheet**