



Opteon™ XL41

Refrigerant (R-454B)

Product Information

Opteon™ XL41 (R-454B) is a mildly flammable low global warming potential (GWP) hydrofluoroolefin (HFO) based refrigerant to replace R-410A in new equipment designs. Opteon™ XL41 offers the optimal balance of properties to replace R-410A in positive displacement, direct expansion air conditioning, heat pump and chiller applications, or other end-uses where R-410A has historically been used.

Opteon™ XL41 is the lowest GWP solution for R-410A-like replacement (78% reduction), and provides improved performance. Opteon™ XL41 offers similar properties to R-410A which makes it easy and cost-effective to apply in new equipment without major modifications.

Opteon™ XL41 is classified as a lower flammability (ISO/ASHRAE class 2L) refrigerant. Please check your local regulations and Standards such as UL, IEC, or ASHRAE to verify the allowable system charge, new equipment design and safe handling requirements for the intended application.

Applications

- Positive displacement, DX air conditioning, heat pumps and chillers
 - Residential, light commercial, commercial
- Direct replacement (new equipment only) for all equipment types designed for R-410A
 - Window units, portables, mini-splits, ducted splits, PTACs, multi-splits, DX chillers, and others

Benefits

- Lowest GWP replacement for R-410A (reduction of 78 %)
- Comparable capacity and improved efficiency compared to R-410A
- Excellent performance in normal and high ambient conditions
- Very close match to R-410A – easily convertible from R-410A design with minimal changes
- Very low temperature glide – can be topped off after leaks
- Lower toxicity and lower flammability (ISO/ASHRAE 34 A2L)
- Miscible with POE lubricant

Opteon™ XL41 properties

ASHRAE Number	R-454B
Composition Weight %	R-32/R-1234yf 68.9/31.1
Molecular Weight	62.6 g/mol
Normal Boiling Point ¹	-50.5°C (-58.9 °F)
Critical Pressure	5266.9 kPa (763.9 psia)
Critical Temperature	78.1 °C (172.6 °F)
Liquid Density at 21.1 °C (70 °F)	1001.0 kg/m ³ (62.5 lb/ft ³)
Ozone Depletion Potential (CFC-11 = 1.0)	0
AR4 (AR5) GWP (CO ₂ = 1.0)	466 (467)
ASHRAE Safety Classification	A2L
Temperature Glide	-1.5 K (-2.7 R)
Lower Flammability Limit ²	11.5 vol%

1. Normal bubble point

2. ASHRAE Standard 34 - 2022 Addendum A

Conditions: 7.2 °C (45 °F) Evap, 46.1 °C (115 °F) Cond, 11.1 K (20 R) Superheat, 5.5 K (10 R) Subcool, 75% efficiency

	R-410A	R-454B
Relative Capacity	1.00	0.97
Relative COP	1.00	1.02
Relative Mass Flow	1.00	0.82
Suction Pressure kPa (psia)	999.7 (145.0)	928.9(134.72)
Discharge Pressure kPa (psia)	2802.0 (406.4)	2615.2 (379.3)
Discharge Temperature °C (°F)	81.4 (178.6)	87.3 (189.20)

Finding the Right Balance

R-410A (hydrofluorocarbons or HFCs) have served as the primary replacements to ozone-depleting refrigerants like R-12 (chlorofluorocarbons (CFCs) & R-22 (hydrochlorofluorocarbons (HCFCs) for almost three decades. However, R-410A has a relatively high GWP (2088 / AR4 value) and so is the focus of current regulatory efforts to reduce the environmental impact of refrigerant emissions. Currently, there are no comparable non-flammable, low GWP alternatives with pressures close to those of R-410A. For many existing applications, the industry is adopting lower flammable (Class 2L) refrigerants (e.g. Opteon™ XL products) to meet future regulatory requirements.

Regulations Accelerating Change

The 2020 passing of the American Innovation and Manufacturing (AIM) Act is accelerating the phasedown of hydrofluorocarbon (HFC) refrigerants and increasing the importance of adopting lower GWP refrigerants, including those classified as A2L (mildly flammable).

Around the globe, the phasedown of HFC refrigerants is prompting a transition toward alternatives with lower global warming potential (GWP). While A2Ls have been approved for use in many other parts of the world and are now widely adopted in commercial refrigeration applications there, the update of safety standards is nearing completion within the U.S.

The most recent UL 60335-2-40 and 60335-2-89 equipment standards and field applications under ASHRAE-15 have completed their evaluation of A2Ls in equipment.

Conclusion

Regulations designed to reduce the impact of refrigerant emissions on the environment are leading the air conditioning industry towards the use of flammable refrigerants. The development of A2L refrigerants (e.g. Opteon™ XL products) has increased the ability of the industry to safely meet strict GWP targets in a wider range of applications. Extensive research has been carried out to demonstrate differences between the relative flammability of refrigerants, and how they can be safely applied. Ultimately, successful implementation of flammable refrigerants will depend on properly integrating the knowledge gained from industry research into codes and product/safety standards. In addition, extensive education of the industry is required, particularly in the service sector.

For refrigerant related support,
contact our Tech2Tech Support Team
866-433-TECH (8324),
or email tech2tech@chemours.com

For more information on the Opteon™ family of refrigerants or other refrigerants from Chemours, visit opteon.com

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