



# Opteon™ XL40

Refrigerant (R-454A)

## Product Information

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Opteon™ XL40 (R-454A) is a mildly flammable refrigerant with low global warming potential (GWP) for replacement of R-404A in new equipment designs. Opteon™ XL40 is a low GWP hydrofluoro-olefin (HFO) based refrigerant with the optimal balance of properties to replace R-404A in positive displacement, direct expansion low- and medium temperature commercial and industrial applications.

Opteon™ XL40 offers improved energy performance and higher cooling capacities which makes it easy and cost-effective to apply in new equipment without major modifications. Classified as mildly flammable (ISO/ASHRAE Class 2L), Opteon™ XL40 allows much higher charge sizes than other more highly flammable refrigerants and can be safely used by following the applicable codes and standards.

Since Opteon™ XL40 is a mildly flammable class 2L refrigerant, please check your local regulations and Standards such as PED, EN378 or ISO5149 to verify the allowable filling charge and new equipment design and safe handling requirements for the intended application.

### Applications

Low- and Medium temperature commercial and industrial refrigeration designed for R-404A

- Supermarkets
  - Distributed systems
  - Walk-in coolers/freezers, prep rooms, etc.
- Condensing units (e.g. in food service)
- Cold stores
- Self-contained systems

### Benefits

- Low GWP (94 % reduction versus R-404A)<sup>1)</sup>; zero ozone depletion
- Improved capacity and efficiency compared to R-404A
- Very close match to R-404A – easily convertible from current design with minimal changes
- Can be topped off after leaks
- Non-toxic and mildly flammable (ISO/ASHRAE<sup>2)</sup> A2L)
- Allows >1.7 kg minimum filling charge under new Codes & Standards (e.g. ISO 5149 or EN 378)
- Miscible with POE lubricants

### Opteon™ XL40 properties

ASHRAE Number	R-454A
Composition Wt %	R-32/R-1234yf 35/65
Molecular Weight	80.5 g/mol
Boiling Point @ 1 atm (101.3 kPa)	-48.3 °C (-50.6 °F)
Critical Temperature	78.9 °C (174.0 °F)
Liquid Density @ 21.1 °C	992.7 Kg/m <sup>3</sup> (62.0 lb/ft <sup>3</sup> )
Ozone Depletion Potential (CFC-11 = 1.0)	0
AR5 (AR4) GWP (CO <sub>2</sub> = 1.0)	238 (239)
ASHRAE Safety Classification	A2L
Temperature Glide	-5 K
LFL <sup>3)</sup>	0.278 kg/m <sup>3</sup> (17.4 10 <sup>-3</sup> lb/ft <sup>3</sup> )
Burning Velocity @ 23 °C	2.4 cm/s (0.9 in/s)



<sup>1)</sup> According to Assessment Report 4 (AR4) which is the basis for the F-Gas regulation (EU) No. 517/2014.

<sup>2)</sup> American Society of Heating, Refrigerating and Air-Conditioning Engineers

<sup>3)</sup> Based on Worst-case formulation (WCF) flammability.



### What to expect at similar operating conditions

The data below was obtained from theoretical cycle calculations for medium temperature (-8 °C mean evaporating temperature) and low temperature (-35 °C mean evaporating temperature) refrigeration scenarios. For both the medium and low temperature scenarios the following parameters were used: evaporator superheat = 4 K, suction line superheat 8 K, Liquid subcooling 2 K and compressor efficiency = 70 %. <sup>4)</sup>

	Medium Temperature		Low Temperature	
Mean Condensing Temperature	30 °C	45 °C	30 °C	45 °C
Cooling Capacity	+5 %	+9 %	+7 %	+13 %
C.O.P.	+3 %	+7 %	+6 %	+12 %
Relative Mass Flow	-21 %	-21 %	-24 %	-24 %
Suction Pressure	-15 kPa	-15 kPa	-11 kPa	-11 kPa
Discharge Pressure	-1 kPa	+2 kPa	-1 kPa	+2 kPa
Discharge Temperature	+12.6 K	+15.5 K	+21.8 K	+25.1 K

+ is an increase, - is a decrease relative to R-404A

<sup>4)</sup> Actual performance for a specific system depends on a number of factors, including equipment conditions and operating environment.

For more information on the Opteon™ family of refrigerants or other refrigerants from Chemours, visit [opteon.com](http://opteon.com)

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