Opteon™ XL10

Refrigerant (R-1234yf)

Product Information

Opteon™ XL10 (R-1234yf) is a mildly flammable refrigerant with global warming potential (GWP) less than 1 for replacement of R-134a in new equipment designs. Opteon™ XL10 is a low GWP hydrofluoro-olefin (HFO) based refrigerant with the optimal balance of properties to replace R-134a in positive displacement, direct expansion medium temperature commercial and industrial applications.

Opteon™ XL10 offers similar performance to the refrigerants it is designed to replace which makes it easy and cost-effective to apply in new equipment without major modifications. Classified as mildly flammable (ISO/ASHRAE Class 2L), Opteon™ XL10 allows much higher charge sizes than other more highly flammable refrigerants and can be safely used by following the applicable codes and standards. With a GWP of less than 1, Opteon™ XL10 falls not only under the 150-threshold value in the Eco-design and F-Gas regulation 517/2014, but it is also excluded from the latter's Phase-Down scenario which means that it is not consuming any quota in terms of CO_2 equivalents being placed on the market.

Since Opteon™ XL10 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, new equipment design and safe handling requirements for the intended application.

Applications

- Refrigeration & air-conditioning systems formerly designed for R-134a
- Medium temperature commercial and industrial DX refrigeration systems
- Water chillers, air conditioning and heat pumps

Benefits

- < 1 GWP (>99 % reduction versus R-134a) [1]; meets F-Gas and Eco-Design GWP requirements; zero ozone depletion
- Close performance match to R-134a in terms of capacity and efficiency
- Easily convertible from R-134a design with minimal changes
- Single component, no temperature glide
- Non-toxic and mildly flammable (ISO/ASHRAE [2] A2L)
- Allows >1.7 kg minimum filling charge under new Codes & Standards (e.g. ISO 5149 or EN 378)
- Miscible & stable with POE lubricants

Opteon™ XL10 properties

ASHRAE Number	R-1234yf
Composition Wt %	R-1234yf 100
Molecular Weight	114.04 g/mol
Boiling Point @ 1 atm (101.3 kPa)	-29.5 °C (-21.1 °F)
Critical Temperature	94.7 °C (202.4 °F)
Liquid Density @ 21.1 °C	1106 Kg/m³ (69.0 lb/ft³)
Ozone Depletion Potential (CFC-11 = 1.0)	0
AR5 (AR4) GWP (CO_2 = 1.0)	<1 (4)
ASHRAE Safety Classification	A2L
Temperature Glide	-
LFL	0.289 kg/m³ (18.0 10^{-3} lb/ft³)
Burning Velocity @ 23 °C	1.5 cm/s (0.59 in/s)

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

[2] American Society of Heating, Refrigerating and Air-Conditioning Engineers

Low GWP

What to expect at similar operating conditions

The data below was obtained from theoretical cycle calculations for high temperature (0 °C mean evaporating temperature) and medium temperature (-10 °C mean evaporating temperature) refrigeration scenarios. For both the high and medium temperature scenarios the following parameters were used: evaporator superheat = 4 K, suction line superheat 8 K, Liquid subcooling 2 K and compressor efficiency = 70 %. [3)]

	High Temperature		Medium Temperature	
Mean Condensing Temperature	30 °C	45 °C	30 °C	45 °C
Cooling Capacity	-3 %	-6 %	-2 %	-8 %
C.O.P.	-3 %	-6 %	-4 %	-7 %
Relative Mass Flow	+21 %	+21 %	+27 %	-27 %
Suction Pressure	+23 kPa	+23 kPa	+21 kPa	+21 kPa
Discharge Pressure	+13 kPa	-6 kPa	+13 kPa	-6 kPa
Discharge Temperature	-8 K	-11.1 K	-11.2 K	-14.3 K

+ is an increase, - is a decrease relative to R-134a

[3)] 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**

C-10998 (9/2016)