Opteon™ XL20

Refrigerant (R-454C)

Product Information

Opteon™ XL20 (R-454C) is a lower flammability, low global warming potential (GWP), hydrofluoro-olefin (HFO) – based refrigerant for new equipment. For positive displacement, direct expansion low- and medium temperature refrigeration applications, XL20 is an alternative to legacy HFC refrigerants such as R-404A, R-507, and R-407 series fluids. Opteon™ XL20 also provides an optimal balance of sustainability, performance, and safety for many heat pump applications.

With a GWP of 148(AR4), Opteon™ XL20 meets many of the application specific regulations requiring new system designs to utilize < 150 GWP refrigerants, such as the proposal in subsection (i) of the American Innovation and Manufacturing (AIM) act or F-Gas Regulation 517/2014.

Since Opteon™ XL20 is classified as a lower flammability (ISO/ASHRAE Class 2L) refrigerant, it allows for larger charge sizes compared to flammable and higher flammability ASHRAE/ISO Class 2 and 3 refrigerants. Users should always check relevant regulations and standards to verify the allowable charge, new equipment design and safe handling requirements for the intended application.

Applications

- Low and medium temperature commercial and industrial refrigeration systems formerly designed for high GWP HFC and HCFC refrigerants such as R-22, R-404A, R-507, and R-407 series
- Supermarkets
  - Distributed system
  - Walk in cooler/freezer, prep rooms, etc.
- Condensing units (e.g. in food service)
- Cold Storage Refrigeration
- Self-Contained refrigeration systems (e.g. ice makers, ice cream machines, etc.)
- Residential and commercial heat pumps (air to water, brine to water, etc.)

Benefits

- AR4 GWP of 148 (96 % reduction versus R-404A)
- Zero ozone depletion
- Better energy efficiency ratio relative to R-404A
- Minimal equipment sizing differences relative to legacy HFC/HCFC designs
- Can be topped-off after leaks
- ASHRAE Safety classification of A2L enables higher charge sizes than ASHRAE A2 or A3 refrigerants in most applications
- Miscible with POE lubricants

Opteon™ XL20 properties

ASHRAE Number	R-454C
Composition Weight %	R-32/R-1234yf 21.5/78.5
Molecular Weight	90.8 g/mol
Normal Boiling Point[1]	-45.6 °C (-50.0 °F)
Critical Pressure	4318.9 kPa (626.4 psia)
Critical Temperature	85.7 °C (186.2 °F)
Liquid Density at 21.1 °C (70 °F)	1058.2 kg/m³ (66.1 lb/ft³)
Ozone Depletion Potential (CFC-11 = 1.0)	0
AR4 (AR5) GWP (CO_2 = 1.0)	148 (146)
ASHRAE Safety Classification	A2L
Temperature Glide	-6 K (-10.8 R)
Lower Flammability Limit[2]	7.7 vol%

[1] Normal bubble point

[2] ASHRAE Standard 34 - 2022 Addendum A

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LOW GWP ©

Thermodynamic Performance

The tables below summarize the thermodynamic cycle performance of R-454C relative to R-404A at standard low and medium temperature refrigeration conditions.

***Low Temperature Model Conditions:**
40.5 °C (105 °F) Cond, -28.8 °C (-20 °F) Evap, 16.6 K (30 R) Superheat, 5.5 K (10 R) Subcool, 75% efficiency

Refrigerant	Relative Capacity	Relative COP	Relative Mass Flow Rate	Suction Pressure kPa (psia)	Discharge Pressure kPa (psia)	Discharge Temperature °C (°F)
R-404A	1.00	1.00	1.00	213.1 (30.9)	1846.4 (267.8)	78.4 (173.1)
R-454C	0.89	1.06	0.80	167.5 (24.3)	1612.0 (233.8)	88.9 (192.1)

*Evap and Cond temp are in mid-point

Medium temperature Model Conditions:
40.5 °C (105 °F) Cond, -6.7 °C (20 °F) Evap, 16.6 K (30 R) Superheat, 5.5 K (10 R) Subcool, 75% efficiency

Refrigerant	Relative Capacity	Relative COP	Relative Mass Flow Rate	Suction Pressure kPa (psia)	Discharge Pressure kPa (psia)	Discharge Temperature °C (°F)
R-404A	1.00	1.00	1.00	486.1 (70.5)	1846.4 (267.8)	69.3 (156.8)
R-454C	0.91	1.04	0.81	397.8 (57.7)	1612.0 (233.8)	76.8 (170.2)

*Evap and Cond temp are in mid-point

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

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

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