



# Opteon™ XL20

Refrigerant (R-454C)

## Product Information

Opteon™ XL20 (R-454C) is a mildly flammable refrigerant with global warming potential (GWP) less than 150 for replacement of R-404A and R-22 in new equipment designs. Opteon™ XL20 is a low GWP hydrofluoro-olefin (HFO) based refrigerant with the optimal balance of properties to replace R-404A and R-22 in positive displacement, direct expansion low- and medium temperature commercial and industrial applications.

Opteon™ XL20 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™ XL20 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 148, Opteon™ XL20 falls under the 150-threshold value in the F-Gas regulation 517/2014 and Eco-design, thus being particularly suited for hermetically-sealed systems.

Since Opteon™ XL20 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

Low- and Medium temperature commercial and industrial refrigeration systems formerly designed for R-404A or R-22

- Supermarkets
  - Distributed systems
  - Walk-in coolers/freezers, prep rooms, etc.
- Condensing units (e.g. in food service)
- Cold stores
- Self-contained systems
- Ideal for hermetically-sealed refrigeration systems (GWP < 150)

### Benefits

- < 150 GWP (96 % reduction versus R-404A)<sup>1</sup>; meets F-Gas and Eco-Design GWP requirements; zero ozone depletion
- Close performance match to R-404A; slightly reduced capacity, improved efficiency
- Easily convertible from R-404A and R-22 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™ XL20 properties

|   |   |
|---|---|
| ASHRAE Number                               | R-454C  |
| Composition<br>Wt %                         | R-32/R-1234yf<br>21.5/78.5  |
| Molecular Weight                            | 90.8 g/mol  |
| Boiling Point @ 1 atm (101.3 kPa)           | -45.9 °C (-50.6 °F)   |
| Critical Temperature                        | 82.4 °C (180.3 °F)  |
| Liquid Density @ 21.1 °C                    | 999.5 Kg/m <sup>3</sup> (62.4 lb/ft <sup>3</sup> )                  |
| Ozone Depletion Potential<br>(CFC-11 = 1.0) | 0   |
| AR5 (AR4) GWP (CO <sub>2</sub> = 1.0)       | 146 (148)   |
| ASHRAE Safety Classification                | A2L   |
| Temperature Glide                           | -6 K  |
| LFL <sup>3</sup>                            | 0.293 kg/m <sup>3</sup> (18.3 10 <sup>-3</sup> lb/ft <sup>3</sup> ) |
| Burning Velocity @ 23 °C                    | 1.6 cm/s (0.6 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            | -11 %              | -9 %     | -12 %           | -10 %    |
| C.O.P.                      | +5 %               | +8 %     | +6 %            | +11 %    |
| Relative Mass Flow          | -26 %              | -26 %    | -30 %           | -29 %    |
| Suction Pressure            | -87 kPa            | -93 kPa  | -37 kPa         | -40 kPa  |
| Discharge Pressure          | -219 kPa           | -306 kPa | -219 kPa        | -306 kPa |
| Discharge Temperature       | +6.6 K             | +7.7 K   | +10.5 K         | +11.8 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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