



DuPont Fluorochemicals

ART-35

Properties and Applications of DuPont R-507 Refrigerant

DuPont R-507 is a non-ozone depleting replacement for R-502 in refrigeration applications. This document will discuss general properties of DuPont R-507 and how it may be used in refrigeration applications.

Properties

DuPont R-507 is a mixture of hydrofluorocarbon refrigerants HFC-125 and HFC-143a. It is an azeotrope, nonflammable, and has no ozone depletion potential. These properties make it a candidate refrigerant for applications where safety and consistency of performance are needed.

DuPont R-507 will maintain a very consistent composition if leakage occurs in a refrigeration system, which means that operating performance will remain consistent following leakage/recharge cycles. As with all mixtures, we recommend that the liquid phase be removed from the storage cylinder to minimize composition changes when charging. DuPont R-507 should not be mixed with any other refrigerant when charging, recycling, recovering or reclaiming.

Table 1
General Properties of DuPont R-507

Boiling Point (1 atm), °C (°F)	-46.7 (-52.1)
Critical Temperature, °C (°F)	70.9 (159.6)
Critical Pressure, kPa (psia)	3793.6 (550)
Latent Heat of Vaporization at Boiling Point, kJ/kg (Btu/lb)	200.5 (86.2)
Saturated Vapor Density at -15°C, kg/cu m (lb/cu ft)	19.6 (1.23)
Ozone Depletion Potential	0
Global Warming Potential (HGWP; R-502 = 3.75)	1.0
DuPont AEL*, ppm (8 and 12-hour T.W.A.)	1,000
Flammability	None

* AEL (Acceptable Exposure Limit) is an airborne exposure limit established by DuPont toxicologists to which nearly all workers can be repeatedly exposed during a 40-hour workweek, or 8-hour day, without adverse effects. This limit for R-507 is calculated based on the AEL for its individual components.

Being nonflammable, DuPont R-507 can be safely used in commercial systems such as supermarkets or transport refrigeration, where personnel and the public are in the vicinity of the refrigeration equipment. DuPont recommends the use of polyolester lubricants with DuPont R-507; however, the compressor manufacturer should always be consulted for specific lubricant selection. R-507/polyolester mixtures have better miscibility than R-502/mineral oil at low temperatures, which should aid in oil return for low-temperature applications.

Operating Characteristics

DuPont R-507 is a long-term replacement for R-502 and offers good operating characteristics when compared to R-502. Capacity and efficiency values should be nearly equivalent to R-502. The compressor discharge temperature may be as much as 7.4°C (13.3°F) lower than with R-502, which may equate to longer compressor life and better lubricant stability. For example, if a system were operated at -17.8°C (0°F) evaporation and 32.2°C (90°F) condensing, with an 18.3°C (65°F) suction gas temperature, estimated values of performance (with R-502 equal to 1.0) are as follows.

Table 2
Estimated Values of Performance

Capacity	1.06
Theoretical Efficiency	0.94
Discharge Temperature	7.7°C (13.9°F) lower than R-502
Discharge Pressure	149.9 kPa (21.7 psi) higher than R-502
Suction Pressure	26.8 kPa (3.88 psi) higher than R-502

Commercial Availability

DuPont R-507 components are TSCA (U.S.A.) and EINECS (Europe) listed; also, DuPont R-507 has been recognized by Underwriters Laboratories (UL).

Commercial quantities of DuPont R-507 are available. Contact DuPont at locations shown on the back page, or contact any DuPont authorized distributor for more information.

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