

Application	Product Name	ASHRAE #	ASHRAE Class	GWP AR4 (AR5)	Compatible Oil	Comment
R-22 Replacements for A/C, Heat Pumps	Freon™ MO99™	R-438A	A1	2264 (2059)	MO, AB, POE	Great choice in systems where changing to POE oil is not practical, elastomeric seals require replacement.
	Freon™ NU-22B™	R-422B	A1	2525 (2289)	MO, AB, POE	Great choice in systems where changing to POE oil is not practical, elastomeric seals require replacement.
	Freon™ 407C	R-407C	A1	1774 (1624)	POE	Closest performance match to R-22 in A/C applications. Retrofits require a lubricant change to POE oil and replacement of critical elastomeric seals.
R-22, R-407A, R-407F for Refrigeration	Opteon™ XP40	R-449A	A1	1397 (1282)	POE	Lowest GWP retrofit refrigerant for R-22 designed systems. R-22 to Opteon™ XP40 retrofits will require replacement of critical elastomeric seals and a lubricant change to POE oil.
R-404A, R-507 Replacements	Opteon™ XP40	R-449A	A1	1397 (1282)	POE	Lowest GWP retrofit refrigerant for R-404A/R-507 designed systems. R-404A/R-507 to Opteon™ XP40 retrofits require adjustment of the TXVs and in most cases it is suggested to replace the R-404A power element to a R-449A power element. Consult compressor manufacturer guidelines for necessity of demand cooling in low temperature applications.
	Opteon™ XP44	R-452A	A1	2140 (1945)	POE	Discharge temperature and mass flow match to R-404A/R-507. Best used in situations where liquid injection cannot be installed on the low temperature compressor. Check SNAP approvals before use in USA.
R-134a Replacement for AC, Refrigeration	Opteon™ XP10	R-513A	A1	631 (573)	POE	Lowest GWP retrofit refrigerant for R-134a designed systems. Elastomeric seals replacement or lubricant change not required. Minor adjustments to TXV post retrofit might be necessary.
R-123 Replacement	Opteon™ XP30	R-514A	B1	7 (2)	POE	Similar performance match to R-123. Consult with equipment manufacturer prior to retrofit.

Performance Comparison of Retrofit Refrigerants

Application	Product Name	Compared To	Application Conditions	Relative Capacity (%)	Relative EER (%)	Relative Mass Flow (%)	Suction Pressure (psi)	Discharge Pressure (psi)	Discharge Temp (°F)
Retrofit Refrigerants for Commercial Refrigeration	Opteon™ XP40 (R-449A)	R-22	LT	+5	-1	+18	+2	+33	-32
		R-22	MT	+4	-5	+14	+6	+33	-29
		R-404A	LT	-1	+4	-23	-4	-9	+32
		R-404A	MT	0	+2	-20	-7	-9	+18
	Opteon™ XP44 (R-452A)	R-404A	LT	-1	0	+2	-1	+2	+1
		R-404A	MT	0	-1	+3	-2	+2	+1
Opteon™ XP10 (R-513A)	R-134a	MT	+3	-2	+19	+8	-13	-13	
Retrofit Refrigerants for A/C	Opteon™ XP30 (R-514A)	R-123	AC	-5	0	-10	0	-1	-4
	Opteon™ XP10 (R-513A)	R-134a	AC	-2	-2	+11	+5	+8	-7
	Freon™ MO99™ (R-438A)	R-22	AC	-7	-4	+12	-3	+5	-30
	Freon™ NU-22B™ (R-422B)	R-22	AC	-11	-4	+20	-4	-5	+37
	Freon™ 407C	R-22	AC	0	-4	+3	+1	+20	-17

LT=Low Temperature, MT=Medium Temperature, AC=Air Conditioning, MO=Mineral Oil, AB=Alkylbenzene, POE=Polyol Ester, GWP=Global Warming Potential, Freon™ NU-22B™ is not available in Canada.

Application Conditions: LT=Low Temperature; -22 °F avg evaporator, 104 °F avg condenser, 14 °F return gas T, 97 °F subcool T • MT=Medium Temperature; 20 °F avg evaporator, 105 °F avg condenser, 40 °F return gas T, 95 °F subcool T • HT=High Temperature (A/C); 45°F avg evaporator, 115 °F avg condenser, 65 °F return gas T, 100 °F subcool T

Performance data is based on theoretical calculations at typical application conditions. Actual performance will vary depending on system design and conditions. Always consult the detailed retrofit guidelines prior to use.

More detailed information on refrigerants including the retrofit guidelines, case histories, regulations and thermodynamic properties are available at www.freon.com and www.opteon.com

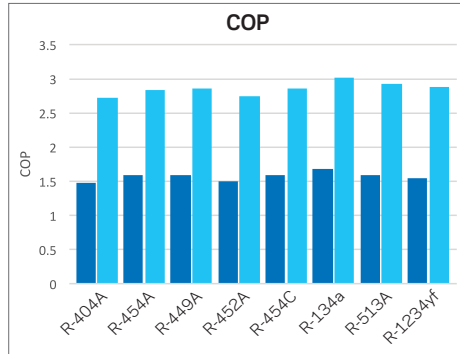
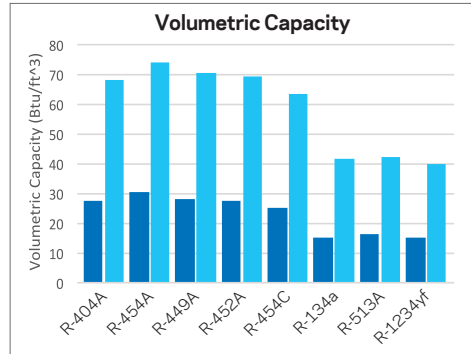
Refrigeration Medium / Low Temp

Product Name	ASHRAE #	Incumbent Refrigerant	ASHRAE CLASS	GWP / AR4 (AR5)	Normal Boiling Point °F
Opteon™ XP10	R-513A	R-134a	A1	631 (573)	-21
Opteon™ XP40	R-449A	R-404A	A1	1397 (1282)	-51
Opteon™ XP44	R-452A	R-404A	A1	2140 (1945)	-53
Opteon™ XL10	R-1234yf	R-134a	A2L	4 (1)	-21
Opteon™ XL20	R-454C	R-407A	A2L	148 (146)	-50
Opteon™ XL40	R-454A	R-404A	A2L	239 (238)	-54
Freon™ 404A	R-404A	N/A	A1	3922 (3943)	-51
Freon™ 134a	R-134a	N/A	A1	1430 (1300)	-15

A/C and Heat Pumps

Product Name	ASHRAE #	Incumbent Refrigerant	ASHRAE CLASS	GWP / AR4 (AR5)	Normal Boiling Point °F
Opteon™ XL10	R-1234yf	R-134a	A2L	4 (1)	-21
Opteon™ XP10	R-513A	R-134a	A1	631 (573)	-21
Opteon™ XP30	R-514A	R-123	B1	7 (2)	84
Opteon™ XL20	R-454C	R-407C	A2L	148 (146)	-50
Opteon™ XL41	R-454B	R-410A	A2L	466 (467)	-51
Freon™ 410A	R-410A	N/A	A1	2088 (1924)	-61
Freon™ 134a	R-134a	N/A	A1	1430 (1300)	-15
Freon™ 123	R-123	N/A	A1	77 (79)	82

Refrigeration ■ Low Temp ■ Medium Temp



A/C

