

Introducing
Cool50
a better alternative™

No oil
change
required



Compatible
with all
lubricants

Zero ODP Replacement for R22
ASHRAE Number (R424A)

Coolgas
refrigerants made simple™

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THE ZERO ODP REPLACEMENT COMPATIBLE WITH ALL LUBRICANTS

HCFC 22 is a controlled substance under the Montreal Protocol and European Regulation and will be phased out on a global basis with all other HCFCs. HCFC 22 and all refrigerant blends containing HCFC 22 have been banned in Europe in new equipment and also for service work (reclaimed HCFC 22 is permitted but only until 2014). In many other countries, HCFC 22 is subject to a rapidly tightening cutback schedule. In all territories, therefore, it is now time to consider the options for replacing HCFC 22 which will become restricted in availability as these cutbacks come into effect.

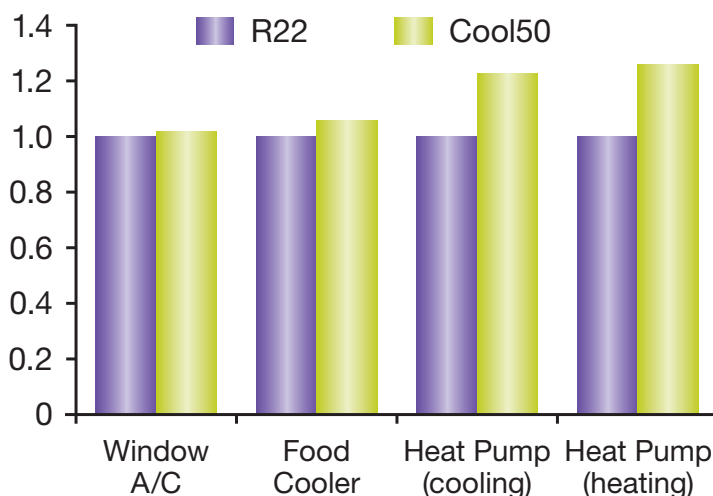
Cool50 provides a low cost and easy solution to replacing HCFC 22 by avoiding a costly and technically unsatisfactory retrofit situation. By definition, any replacement for HCFC 22 must have no ozone depleting ability so that, in contrast to replacing CFCs (e.g. R12, R502) where there were "interim" blends available (largely containing HCFC 22) enabling the existing lubricant in the system to be used, this is not an option when seeking to replace HCFC 22. Cool50 has a zero Ozone Depletion Potential, a similar performance to HCFC 22, and can be used with all types of lubricants.

COMPARISON WITH HCFC 22

- Higher coefficient of performance
- Lower discharge temperature
- Zero ozone depletion potential
- Nonflammable
- Lower discharge pressure
- Similar capacity
- Compatible with existing oils
- No hardware changes needed

The lower head pressure obtained when using Cool50 provides significant operational benefits, while the higher coefficient of performance reduces energy costs and has a beneficial effect on the total equivalent warming impact (TEWI) of the whole system. The significantly lower discharge temperatures and pressures of Cool50 improve the reliability and extend the life of the compressor, and reduce the problem of oil decomposition.

Relative COPs of R22 and Cool50



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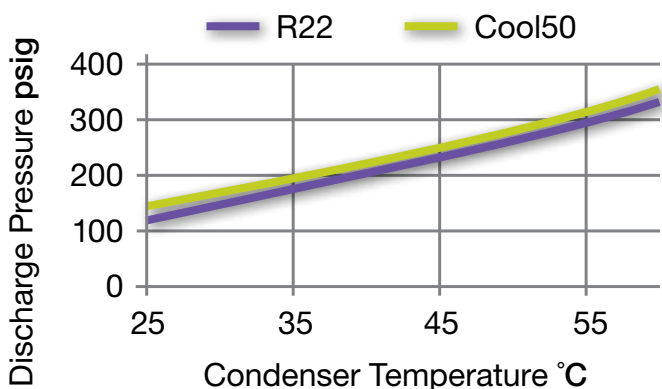
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APPLICATIONS

Cool50 has been developed for use in all applications where HCFC 22 has traditionally been used including commercial air conditioning, commercial and industrial refrigeration, appliances, and others.

Discharge Pressure vs. Condenser Temperature



SERVICING

Because Cool50 is a blend, it should be charged into the system in the liquid as opposed to vapor form. There is no need to make any hardware changes when converting from R22 to Cool50.

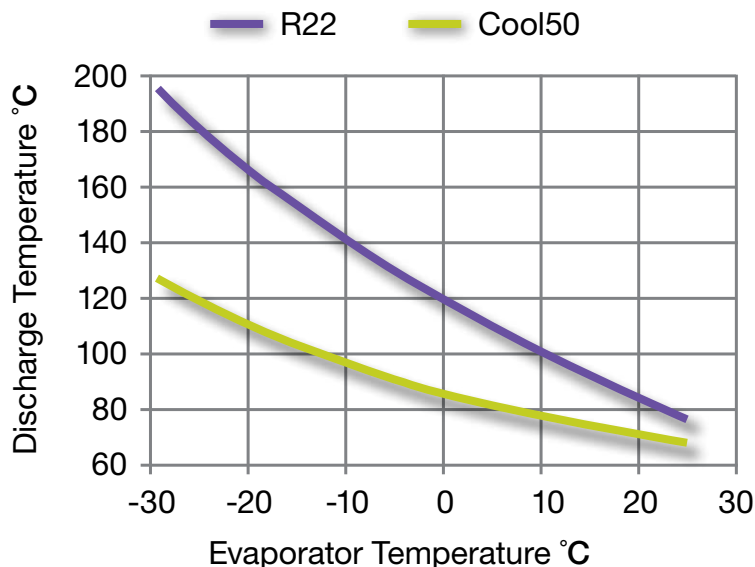
LUBRICANTS

Cool50 is compatible with both the traditional and new synthetic lubricants so that there is no need to change the oil when converting from HCFC 22 to Cool50. Cool50 is suitable for use with mineral, alkylbenzene, and polyol ester lubricants.

SAFETY

Cool50 (R424A) has been awarded a safety classification of A1, namely of low toxicity and nonflammable, by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE).

Discharge Temperature vs. Evaporator Temperature



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PHYSICAL PROPERTIES		Cool50	R22
Molecular weight		108.1	86.5
Boiling point (1 atm)	°C	-38.7 ⁽¹⁾	-40.8
	°F	-37.6 ⁽¹⁾	-41.4
Critical temperature	°C	88.8	96.1
	°F	191.8	204.8
Critical pressure	bara	40.4	49.9
	psia	586	724
Liquid density at 25°C	kg/m ³	1169	1191
Density of saturated vapor at 25°C	kg/m ³	43.6	44.2
Latent heat of vaporization @ boiling point	KJ/kg	196 ⁽¹⁾	234
Cv at 25°C and 1 bara	KJ/kg°K	0.765	0.559
Cp at 25°C and 1 bara	KJ/kg°K	0.85	0.662
Cp/Cv at 25°C and 1 bara		1.111	1.185
Vapor pressure at 25°C	bara	9.67 ⁽¹⁾	10.4
	psia	140.2 ⁽¹⁾	151
Vapor viscosity at 25°C and 1 bara	cP	0.0122	0.0126
Liquid viscosity at 25°C	cP	0.167	0.166
Liquid thermal conductivity at 25°C	W/m.K	0.072	0.0837
Surface tension at 25°C	N/m	0.00656	0.00808
Specific heat of liquid at 25°C	KJ/kg°K	1.423	1.26
Ozone depletion potential	ODP	0	0.055
Flammability limit in air (1 atm)	vol%	none	none
Inhalation exposure (8 hr day and 40 hr week)	ppm	1000	1000

⁽¹⁾ Bubble point

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