

RS-45 (R434A)

Replacement for R22 in air
conditioning & refrigeration

and

Near azeotropic replacement for R407C

Compatible with mineral , alkylbenzene
& polyol ester lubricants

from

REFRIGERANT SOLUTIONS LIMITED

The Refrigerant Specialists



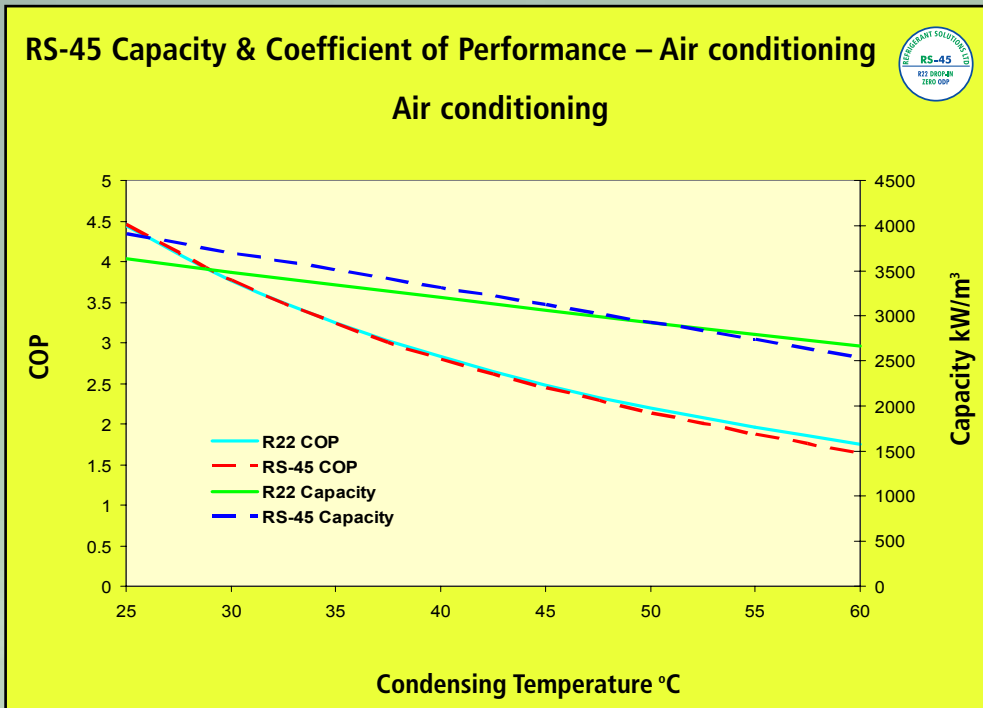


RS-45 (R434A)

Zero ODP replacement for R22 in new & existing systems, & compatible with all lubricants

RS-45 with its high cooling capacity compliments RS-44 (R424A), and is compatible with all types of lubricants. RS-45 replaces R22 in both refrigeration & air conditioning applications. With its low glide (one third of R407C), RS-45 can be used in a wide range of applications. RS-45 provides Original Equipment Manufacturers with an alternative to R407C but without the problems associated with a wide glide.

RS-45 is compatible both with the traditional mineral & alkylbenzene oils, and also the new polyol ester lubricants. Consequently, R22 can be replaced by RS-45 in both new equipment & in retrofit situations offering considerable cost savings, where the cost of converting to alternatives such as R407C is either prohibitively expensive or technically unsatisfactory (or both).



Performance Characteristics

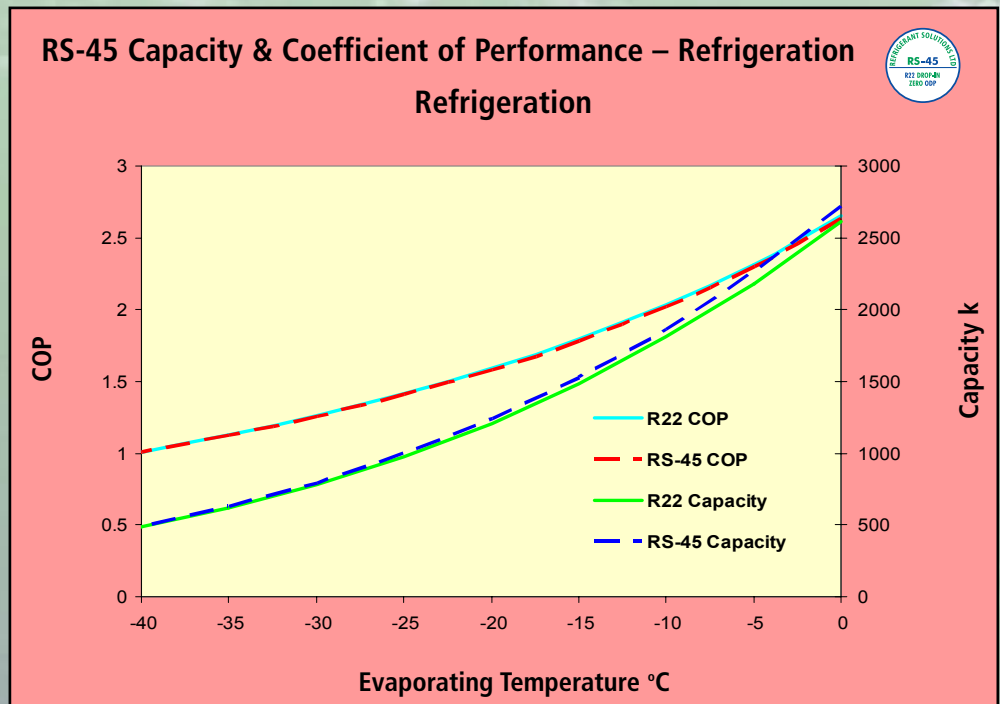
- * Suitable in OEM & retrofit applications
- * Close match for R22 in cooling capacity
- * Low temperature glide
- * Near azeotropic property widens application range
- * Compatible with MO, AB & POE lubricants
- * Effective in low & high temperature applications
- * Same compression ratio as R22
- * Application in systems with a variable expansion device
- * Considerably lower discharge temperature than R22
- * Zero Ozone Depletion Potential
- * Non flammable & low toxicity

Applications

Because RS-45 is a close match for R22 with similar cooling capacity, energy efficiency, pressures & low glide, it is suited for use in new equipment by Original Equipment Manufacturers where it has significant advantages over R407C. RS-45 does not suffer from the inherent disadvantages of R407C & presents OEMs with a realistic alternative when deciding on a replacement for R22.

Owing to the fact that RS-45 is compatible with mineral & alkylbenzene lubricants, it is suitable for use as a Drop-in replacement for R22 in systems which contain an expansion device. In systems with a capillary tube or fixed orifice, RS-44 (R424A) is the preferred product.

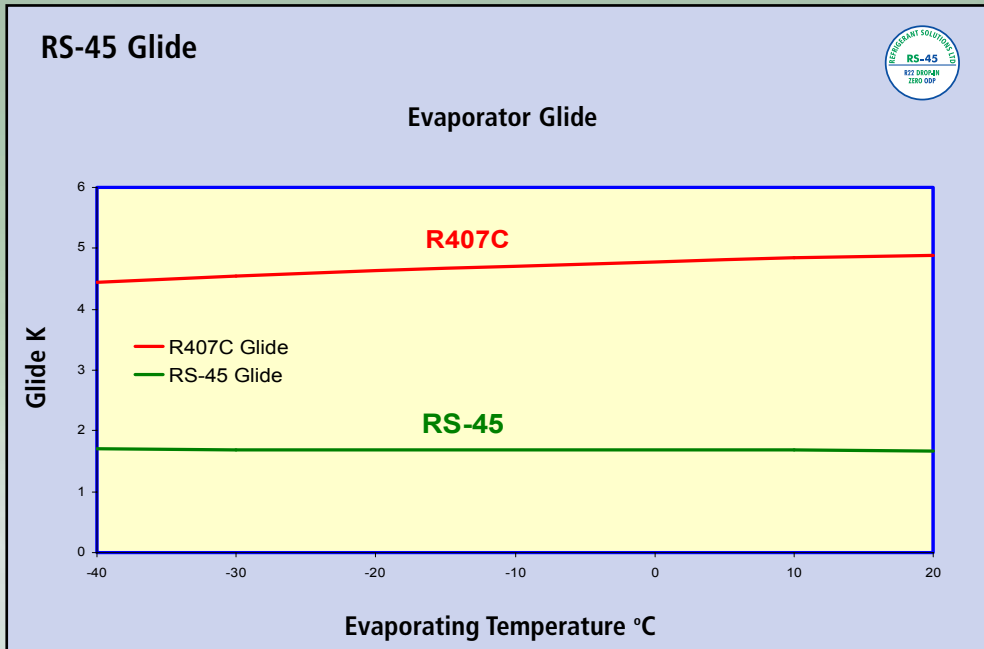
Applications for RS-45 include but are not restricted to air conditioning, refrigerated transport, supermarkets, dairy chillers, cold stores, beer cellars, water chillers and others.



Low Glide Alternative to R407C

RS-45 is a near azeotropic blend with a glide of 1.5°C which compares to R407's glide of 5°C. The high glide of R407C can result in icing up of the evaporator & fractionation of the blend which results in high pressures in the condenser & reduced performance. Consequently, the application range of R407C is limited &, for example, is not suitable for use in flooded systems, chillers, low temperature refrigeration, refrigerated transport, cold stores & other applications.

RS-45 overcomes these problems with its high cooling capacity, energy efficiency & near azeotropic features as well as being compatible not only with synthetic lubricants such as polyol esters but also mineral & alkylbenzene oils. RS-45 is suitable for use in both air conditioning & refrigeration applications



Flooded Systems

RS-45 has replaced HCFC 22 satisfactorily in flooded systems with very similar performance to HCFC 22.

Compression Ratio

High compression ratios can result in increased energy expenditure and the potential for compressor damage. RS-45 has a compression ratio which matches R22 across the range of applications where R22 is commonly found.

Lubricants

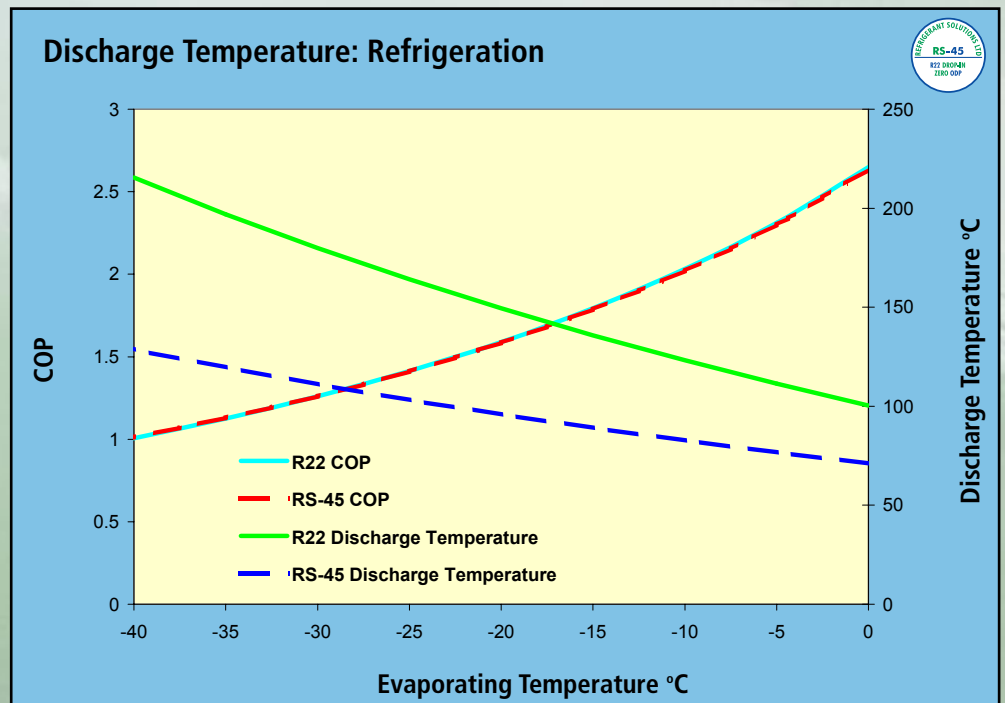
RS-45 is compatible with both the traditional & new synthetic lubricants so that there is no need to change the oil when converting from R22 to RS-45. RS-45 is suitable for use with mineral, alkylbenzene and polyol ester oils.

Safety

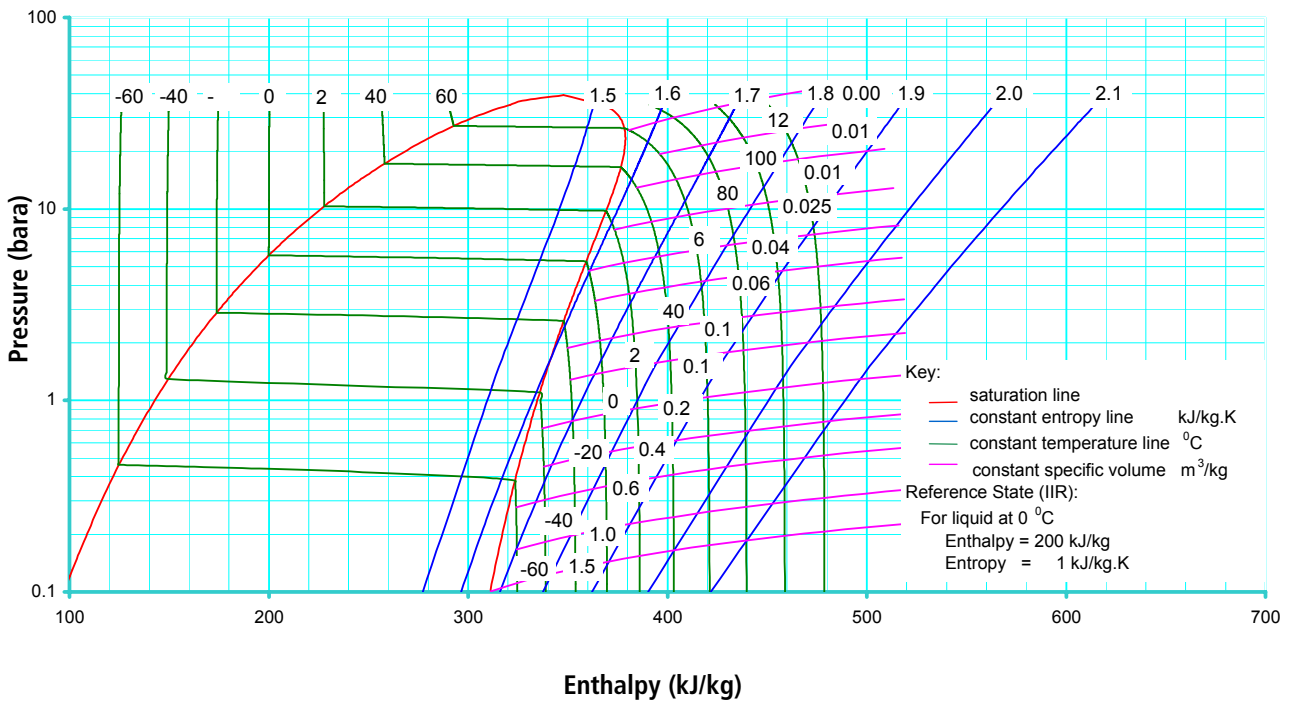
RS-45 (R434A) has been awarded a safety classification of A1, namely of low toxicity and non flammable, by the American Society of Heating, Refrigerating and Air Conditioning-Engineers (ASHRAE).

Servicing

Because RS-45 is a blend, it should be charged into the system in the liquid as opposed to vapour form. There is no need to make any hardware changes when converting from R22 to RS-45 but there may be a need to adjust the expansion device.



RS-45 (R434A) Pressure-Enthalpy Chart



RS 45 (R434A) Physical Properties

PROPERTY		RS-45	R22
Molecular Weight		105.3	86.5
Boiling point (1 atm)	°C	-44.9 ⁽¹⁾	-40.8
	°F	-48.8 ⁽¹⁾	-41.4
Temperature Glide	K	1.5	0
Critical Temperature	°C	77.83	96.1
	°F	172.1	204.8
Critical Pressure	bara	39.31	49.9
	psia	570.2	724
Liquid Density (25 °C)	kg/m ³	1096	1191
Density of saturated vapour (25 °C)	kg/m ³	53.1	44.2
Latent Heat of Vaporisation at boiling point	kJ/kg	190 ⁽¹⁾	234
Cv (25 °C & 1bara)	kJ/kg.K	0.775	0.559
Cp (25 °C & 1bara)	kJ/kg.K	0.861	0.662
Cp/Cv (25 °C & 1 bara)		1.111	1.185
Vapour Pressure (25 °C)	bara	11.8 ⁽¹⁾	10.4
	psia	163 ⁽¹⁾	151
Vapour Viscosity (25 °C & 1 bara)	cP	0.0128	0.0126
Liquid Viscosity (25 °C)	cP	0.136	0.166
Liquid Thermal Conductivity (25 °C)	W/m.K	0.0665	0.0837
Surface Tension (25 °C)	N/m	0.00528	0.00808
Specific heat of liquid (25 °C)	kJ/kg.K	1.50	1.26
Ozone Depletion Potential	ODP	0	0.055
Flammability limit in air (1 atm)	vol%	none	none
Inhalation exposure (8 hour day & 40 hour week)	ppm	1000	1000

⁽¹⁾ Bubble Point



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