

# RS-45

(R-434A)



**R22 REPLACEMENT  
AT ALL TEMPERATURES**

*from*  
**REFRIGERANT SERVICES INC.**



# RS-45

## Capacity

RS-45 is unique in being a capacity match for R22 across the range of applications where R22 is commonly found. No other refrigerant mirrors the

capacity of R22 at low temperature (-35°C evap) & high temperature (+7°C evap)

## Application Range

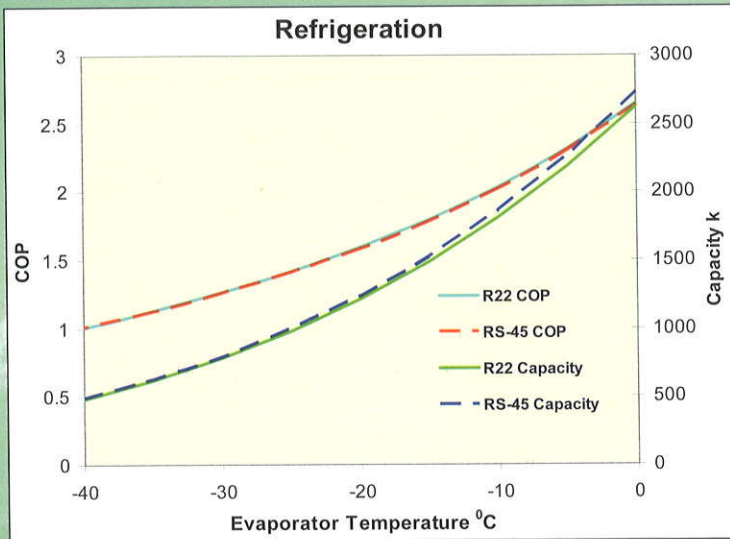
Owing to its unique thermodynamic properties, RS-45(R-434A) has a much wider application range when replacing R22. RS-45 is an excellent replacement for R22 both at high & low temperatures, which is illustrated in charts 1 & 2. In

addition RS-45 has very low glide and can be used in flooded evaporators and other applications where glide can affect performance.

## Lubricants

RS-45(R-434A) is suitable for use with both the traditional lubricants including mineral (MO) & alkylbenzene (AB) oils, & also the new synthetic lubricants including polyol ester (POE), polyalkylglycol (PAG) & others. The ability to use traditional lubricants both reduces cost and avoids the use of hygroscopic synthetic oils which can absorb moisture during maintenance.

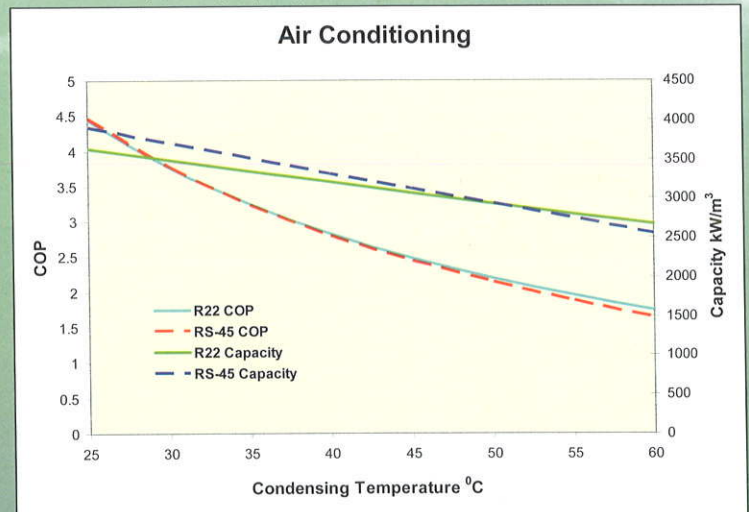
Chart 1: RS-45(R-434A) Capacity & Coefficient of Performance - Refrigeration



## Coefficient Of Performance

RS-45(R-434A) has a Coefficient of Performance which matches R22 as illustrated in charts 1 and 2

Chart 2: RS-45(R-434A) Capacity & Coefficient of Performance - Air conditioning



## Compression Ratio

RS-45 (R-434A) has a compression ratio which matches R22 across the range of applications where

R22 is commonly found.

# RS-45

## Flammability

RS-45(R-434A) is non flammable according to ASHRAE Standard 34 which includes non flammability as formulated & at worst case fractionation. RS-45

has an ASHRAE Safety Rating of A1 the same as R-22.

## Ozone Depletion Potential

RS-45 has no ability to deplete ozone with a zero ODP

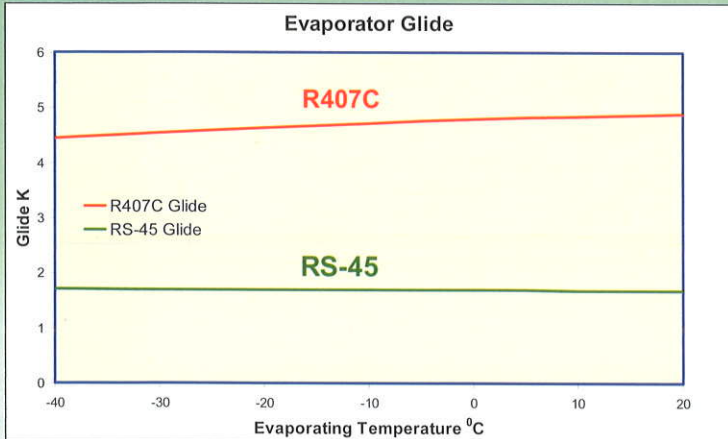
## Glide

RS-45 is a near azeotropic blend with a glide of 1.5°C.

## Discharge Pressure

RS-45(R-434A) has similar discharge pressures to R22.

Chart 3: RS-45(R434A) Glide



## Equipment Modifications

For the same duty RS-45(R-434A) has a higher liquid volume flow rate than R22 which may require retrofitting to optimize performance, notably the following:

Capillary tube: the length may need to be decreased, the diameter increased or a combination of both.

Expansion valve: recommendation is to that the TX valve is sized to accommodate a mass flow 40% greater than R22.

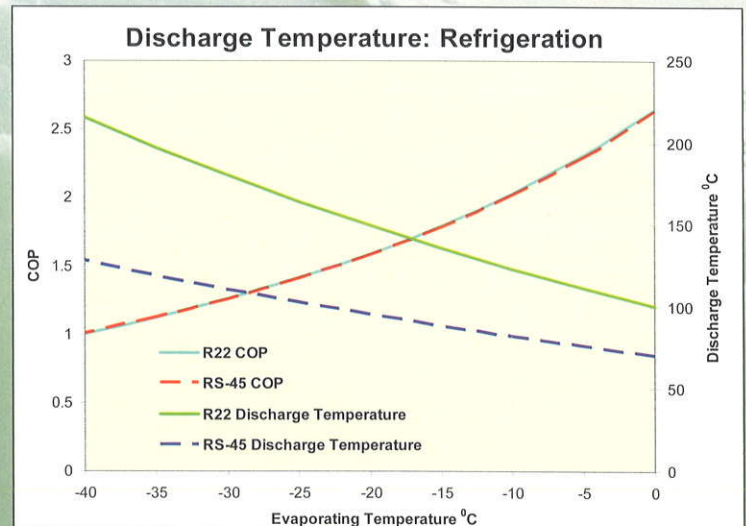
Liquid line: the diameter may need to be increased. On large systems with remote air-cooled condensers the liquid return line from the outlet of the condenser to the inlet of the receiver may also need to be modified.

However, it should be noted that the liquid viscosity of RS-45 is significantly lower than that of R22 (see

physical properties table) so that only modest changes to the liquid lines and expansion devices may be required.

Please refer to Conversion Procedures document for more information.

Chart 4: RS-45(R-434A) Discharge temperature

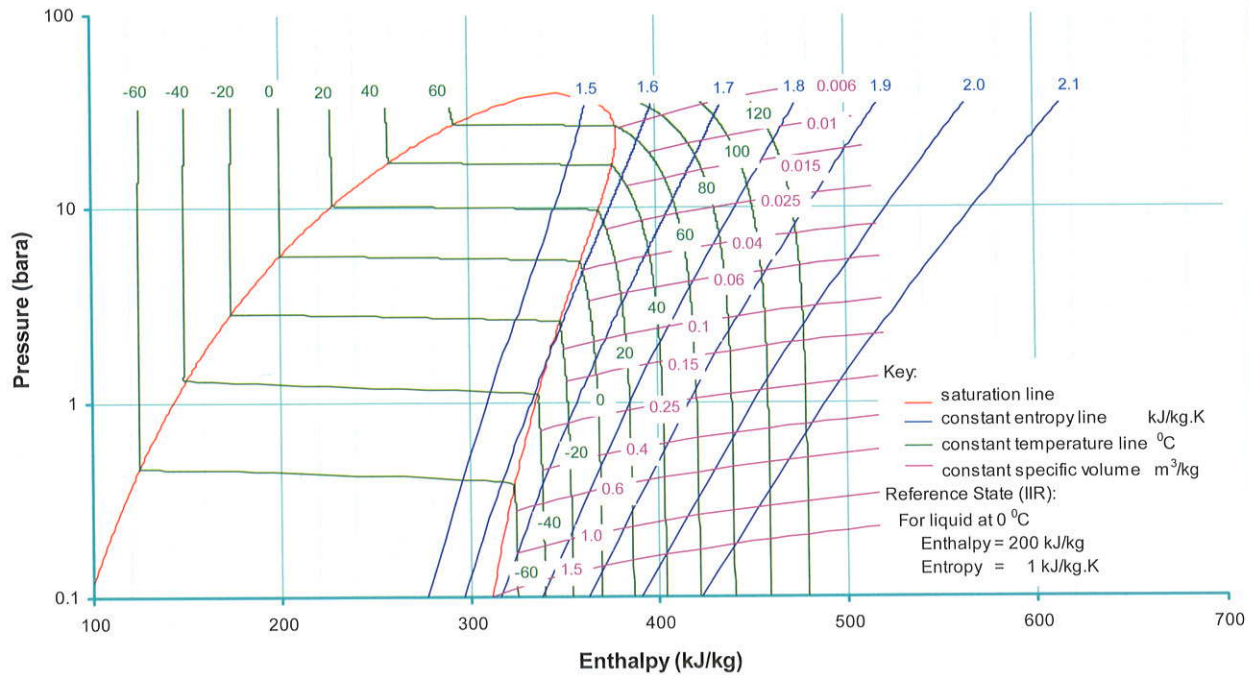


## Discharge Temperature

RS-45(R-434A) has a considerably lower discharge temperature than R22 which provides significant

operating benefits including a much lower risk of oil degradation.

## RS-45 Pressure-Enthalpy Chart



## RS-45 Physical Properties

PROPERTY		RS-45	R22
Molecular Weight		105.3	86.5
Boiling point (1 atm)	$^{\circ}\text{C}$	-44.9 <sup>(1)</sup>	-40.8
	$^{\circ}\text{F}$	-48.8 <sup>(1)</sup>	-41.4
Temperature Glide	K	1.5	0
Critical Temperature	$^{\circ}\text{C}$	77.83	96.1
	$^{\circ}\text{F}$	172.1	204.8
Critical Pressure	bara	39.31	49.9
	psia	570.2	724
Liquid Density (25 $^{\circ}\text{C}$ )	$\text{kg/m}^3$	1096	1191
Density of saturated vapour (25 $^{\circ}\text{C}$ )	$\text{kg/m}^3$	53.1	44.2
Latent Heat of Vaporisation at boiling point	$\text{kJ/kg}$	190 <sup>(1)</sup>	234
Cv (25 $^{\circ}\text{C}$ & 1bara)	$\text{kJ/kg.K}$	0.775	0.559
Cp (25 $^{\circ}\text{C}$ & 1bara)	$\text{kJ/kg.K}$	0.861	0.662
Cp/Cv (25 $^{\circ}\text{C}$ & 1 bara)		1.111	1.185
Vapour Pressure (25 $^{\circ}\text{C}$ )	bara	11.8 <sup>(1)</sup>	10.4
	psia	163 <sup>(1)</sup>	151
Vapour Viscosity (25 $^{\circ}\text{C}$ & 1 bara)	cP	0.0128	0.0126
Liquid Viscosity (25 $^{\circ}\text{C}$ )	cP	0.140	0.166
Liquid Thermal Conductivity (25 $^{\circ}\text{C}$ )	W/m.K	0.0665	0.0837
Surface Tension (25 $^{\circ}\text{C}$ )	N/m	0.00528	0.00808
Specific heat of liquid (25 $^{\circ}\text{C}$ )	$\text{kJ/kg.K}$	1.50	1.26
Ozone Depletion Potential	ODP	0	0.055
Flammability limit in air (1 atm)	vol%	none	none
Inhalation exposure (8 hr day & 40 hr week)	ppm	1000	1000

<sup>(1)</sup> Bubble Point

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