RS-51 (R470B)

Replacement for R404A and R507 with GWP below 750

from

REFRIGERANT SOLUTIONS LIMITED

The Refrigerant Specialists

RS-51 (R470B)

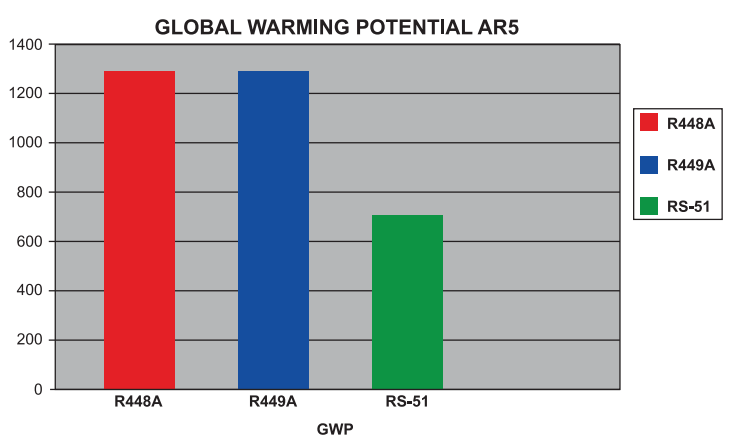
Non-flammable replacement for R404A & R507 with GWP less than 750

RS-51 (R470B) is a non-flammable drop-in replacement for R404A and R507 with a Global Warming Potential (GWP) less than 20% of R404A with similar thermodynamic performance.

RS-51 (R470B) provides an easy and straightforward retrofit option to replace R404A and R507 in existing equipment at low cost. No changes to lubricant and minimal modifications to hardware are necessary so that the overall costs of conversions are kept to a minimum, and purchase of new equipment is avoided. RS-51 (R470B) has similar properties to R404A including Coefficient of Performance, cooling capacity, pressures, discharge temperature, energy efficiency and others. The much lower direct GWP of RS-51 (R470B) means that users will achieve a lower carbon footprint which is a major benefit under the European Union's F Gas regulations.

Global Warming Potential

The European Union F Gas regulations focus on the direct GWPs of refrigerants so that the lower the GWP of a refrigerant the more of that refrigerant can be sold & used. RS-51 (R470B) has been developed as a very low GWP replacement for R404A and R507 with the ***lowest GWP of any non-flammable alternative to R404A on the market.*** The GWP of RS-51 (R470B) is approximately 45% less than R448A and R449A.



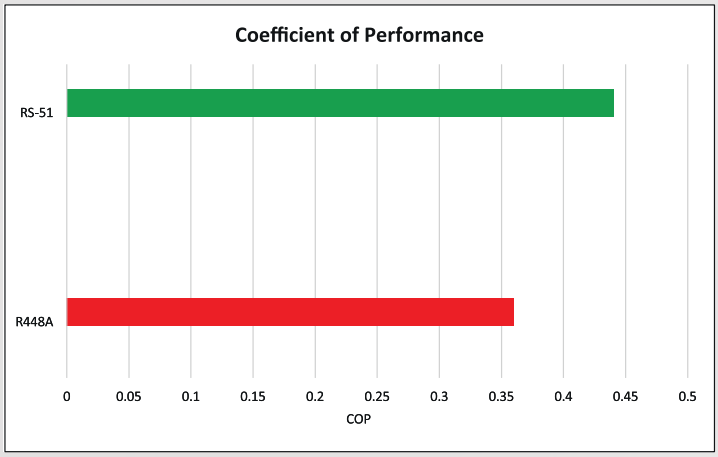
Performance Characteristics

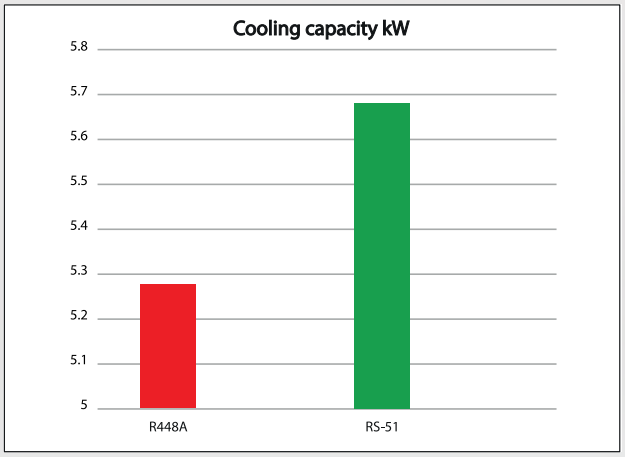
- Global Warming Potential less than 20% of R404A
- GWP approx. 45% less than R448A and R449A
- Higher efficiency than R448A & R449A
- Non-flammable & low toxicity
- Suitable in OEM & retrofit applications
- Similar discharge temperature to R404A
- Minimal changes to hardware
- Compatible with lubricants used with R404A and R507
- Similar cooling capacity and energy efficiency to R404A
- Mass flow equivalent to R448A & R449A
- Zero Ozone Depletion Potential

Refrigeration system formerly operating with R507 retrofitted to RS-51 (R470B)

Applications

RS-51 (R470B) can replace R404A and R507 in many of the applications where these refrigerants are found including supermarkets, cold stores, freezers, ice machines, refrigerated transport, beer cellars, freezer cabinets, transportation of foodstuffs, freeze dryers, environmental test chambers & others.





Lubricants

RS-51 (R470B) is compatible with the same (POE) lubricants which are commonly used with R404A and R507, so that there is no need to change the oil when converting from R404A and R507 to RS-51 (R470B).

Safety

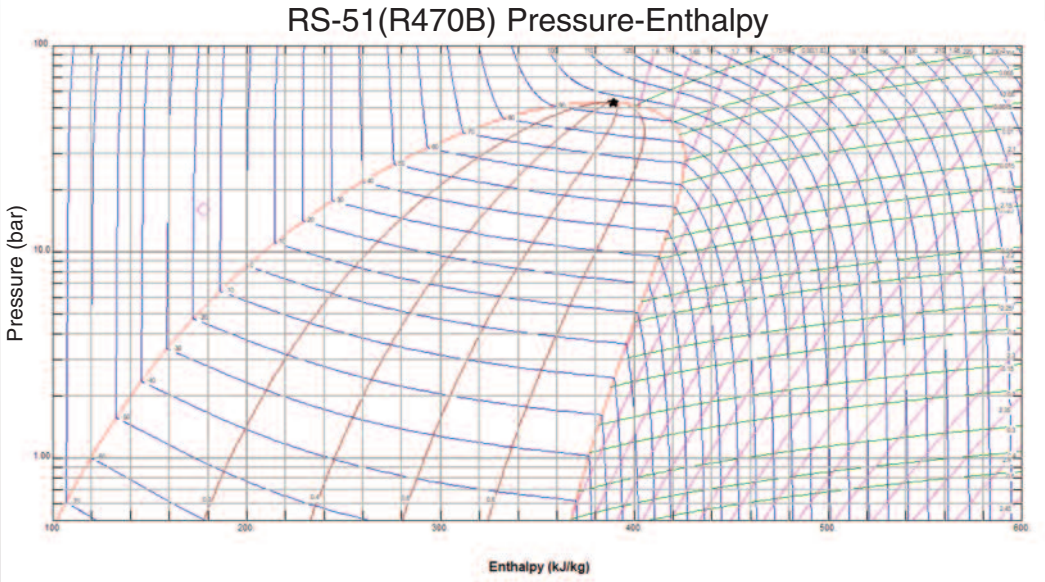
RS-51 (R470B) is non-flammable under all conditions of fractionation as per ASHRAE Standard 34. The components of RS-51 (R470B) have been subjected to toxicity tests carried out by Alternative Fluorocarbons Environmental Acceptability Study (AFEAS), and have been declared to be of low toxicity.

Servicing

Because RS-51 (R470B) is a blend, it should be charged into the system in the liquid as opposed to vapour form. When converting from R404A or R507 to RS-51 (R470B), minimal hardware changes are needed. RS-51 (R470B) has a lower flow rate than R404A and R507, so there may be a need to adjust or change the expansion device during a retrofit.

Technical Data

Technical data including thermodynamic tables, physical properties, retrofit guide, materials of compatibility, questions & answers, etc are available on the web site at www.refsols.com.



RS-51 (R470B) PHYSICAL PROPERTIES

		RS-51 (2)	R404A (2)
Molecular Mass		87.73	97.60
Boiling point (1 atm) (1)	^{0}C	-61.45	-46.23
	^{0}F	-78.6	-51.3
Critical Temperature	^{0}C	94.29	72.12
	^{0}F	201.7	161.8
Critical Pressure	bara	54.66	37.35
	psia	762.8	541.7
Liquid Density (25 ^{0}C) (1)	kg/m^3	1107	1044
Density of saturated vapour (25 ^{0}C) (1)	kg/m^3	56.74	66.41
Latent Heat of Vaporisation at boiling point (3)	kJ/kg	259.9	200.9
Heat capacity constant volume Cv (25 ^{0}C & 1bara)	kJ/kg.K	0.762	0.784
Heat capacity constant pressure Cp (25 ^{0}C & 1bara)	kJ/kg.K	0.862	0.877
Cp/Cv (25 ^{0}C & 1 bara)		1.131	1.118
Vapour Pressure (25 ^{0}C) (1)	bara	17.07	12.55
	psia	247.7	182.0
Vapour Viscosity (25 ^{0}C & 1 bara)	cP	0.0129	0.0121
Liquid Viscosity (25 ^{0}C) (1)	cP	0.143	0.128
Liquid Thermal Conductivity (25 ^{0}C)	W/m.K	0.0812	0.0627
Surface Tension (25 ^{0}C) (1)	N/m	0.0064	0.00446
Specific heat of liquid (25 ^{0}C) (1)	kJ/kg.K	1.54	1.54
Ozone Depletion Potential	ODP	0	0
Global warming potential AR5	GWP	717	3943
Flammability limit in air (1 atm)	vol%	none	none
Inhalation exposure (8 hour day & 40 hour week)	ppm	1000	1000

(1) Bubble Point
(2) RS-51 refrigerant properties obtained from NIST's REFPROP v10 program.
(3) Difference between bubble point liquid enthalpy and dew point vapour enthalpy at 1 atm.

REFRIGERANT SOLUTIONS LIMITED
8 MURIESTON ROAD, HALE, ALTRINCHAM, CHESHIRE WA15 9ST
Tel: (+44) (0)161 926 9876 Fax: (+44) (0)161 926 9875 Email: rs@refsols.com Web: www.refsols.com