RS-51 (R470B) BROCHURE

RS-51 (R470B)

Replacement for R-404A and R507

GWP (Global Warming Potential) below 750

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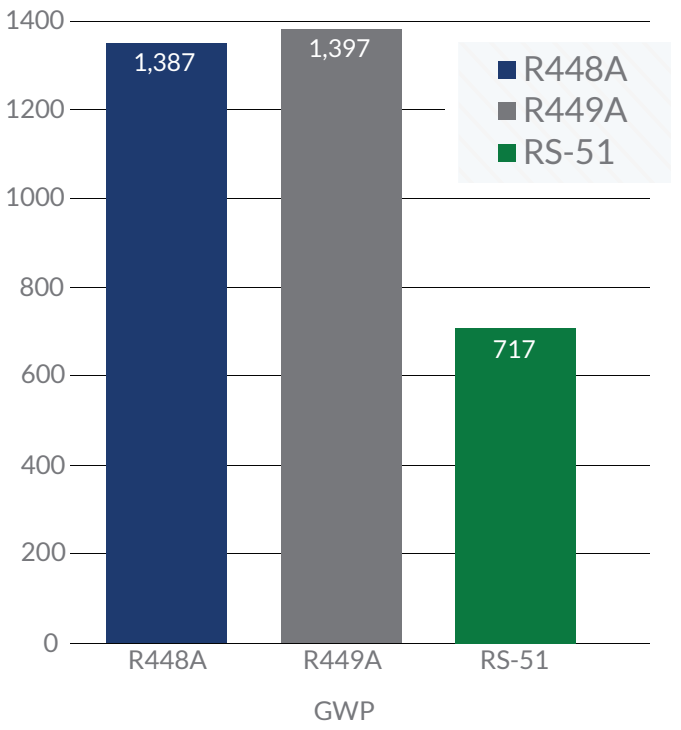
RS-51 INTRODUCTION

RS-51 (R470B) is a non-flammable drop-in replacement for R-404A and R507 with a Global Warming Potential (GWP) less than 20% of R-404A with similar thermodynamic performance.

RS-51 (R470B) provides an easy and straightforward retrofit option to replace R-404A 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 R-404A 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



RS-51 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 R-404A and R507 with the lowest GWP of any non-flammable alternative to R-404A 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 R-404A
- GWP apporx. 45% less than R448A and R449A
- Higher efficiency than R448A and R449A
- Non-flammable and low toxicity
- Suitable in OEM and retrofit applications
- Similar discharge temperature to R-404A
- Minimal changes to hardware
- Compatible with lubricants used with R-404A and R507
- Similar cooling capacity and energy efficiency to R-404A
- Mass flow equivalent to R448A and R449A
- Zero ozone depletion potential

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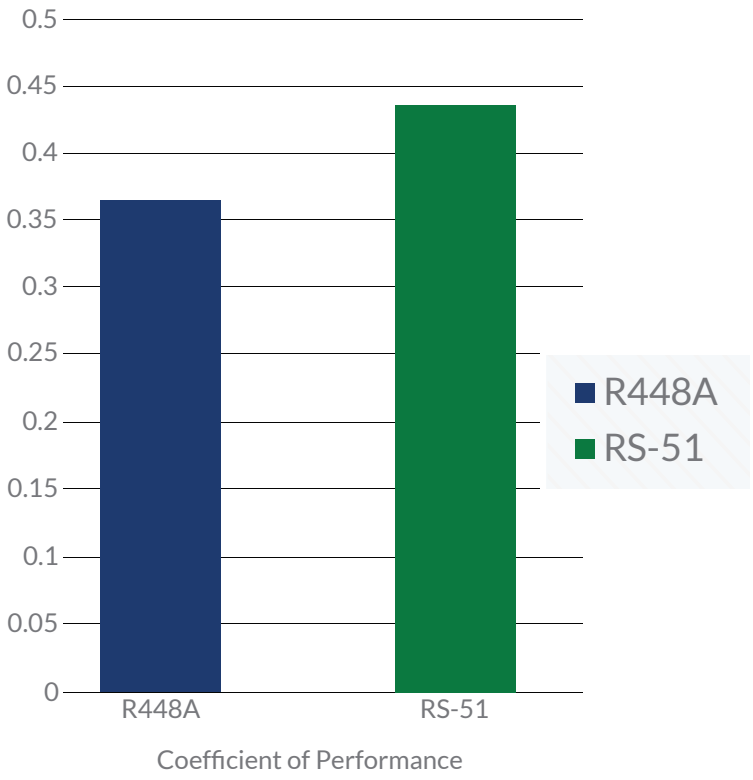
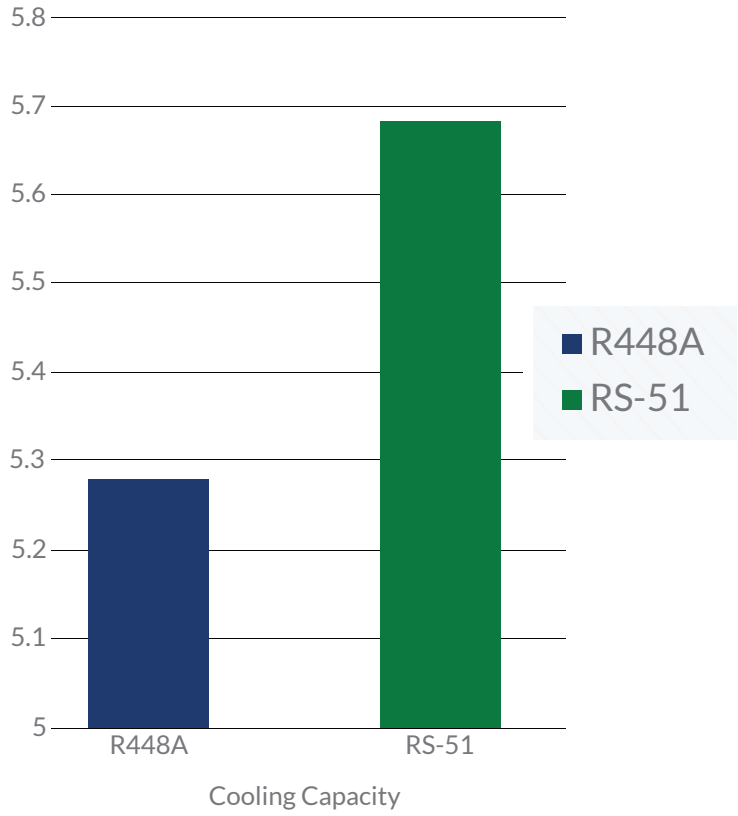
COEFFICIENT OF PERFORMANCE



COOLING CAPACITY



APPLICATIONS

RS-51 (R470B) can replace R-404A 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 R-404A and R507, so that there is no need to change the oil when converting from R-404A 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.

RS-51 (R470B) BROCHURE

SERVICING

Because RS-51 (R470B) is a blend, it should be charged into the system in the liquid as opposed to vapor form. When converting from R-404A or R507 to RS-51 (R470B), minimal hardware changes are needed. RS-51 (R470B) has a lower flow rate than R-404A 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.lowgwpref.com.

RS-51 (R470B) PHYSICAL PROPERTIES

RS-51 Physical Properties		RS-51 [2]	R-404A
Molecular Mass		87.73	97.60
Boiling Point (1atm) [1]	°C °F	-61.45 -78.6	-46.23 -51.2
Surface Tension (25°C) [1]	N/m	0.0064	0.00446
Critical Temperature	°C °F	94.29 201.7	72.12 161.8
Critical Pressure	bara psia	54.66 792.8	37.35 541.7
Liquid Density at 25 °C [1]	kg/m3	1107	1044
Density of Saturated Vapour at 25°C [1]	kg/m3	56.74	66.41
Latent Heat of Vaporisation at boiling point [3]	kJ/kg	259.9	200.9
Heat capacity constant volume Cv (25°C & 1bara)	kJ/kg.K	0.762	0.784
Vapour Pressure at 25°C [1]	bara psia	17.07 247.7	12.55 182.0
Heat capacity constant pressure Cp (25°C & 1bara)	kJ/kg.K	0.862	0.877
Cp/Cv (25°C & 1 bara)		1.131	1.118
Vapor Viscosity (25°C & 1 bara)	cP	0.0129	0.0121
Liquid Viscosity (25°C) [1]	cP	0.143	0.128
Liquid Thermal Conductivity (25°C)	W/m.K	0.0812	0.0627
Specific Heat of Liquid at 25°C [1]	kJ/kg.K	1.54	1.54
Ozone Depletion Potential	ODP	0	0
Surface Tension (25°C) [1]	N/m	0.00642	0.00446
Global Warming Potential (GWP) AR5	GWP	717	3943
Flammability Limit in Air (1 atm)	vol%	None	None
Inhalation Exposure (8 hr Day & 40 hi 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

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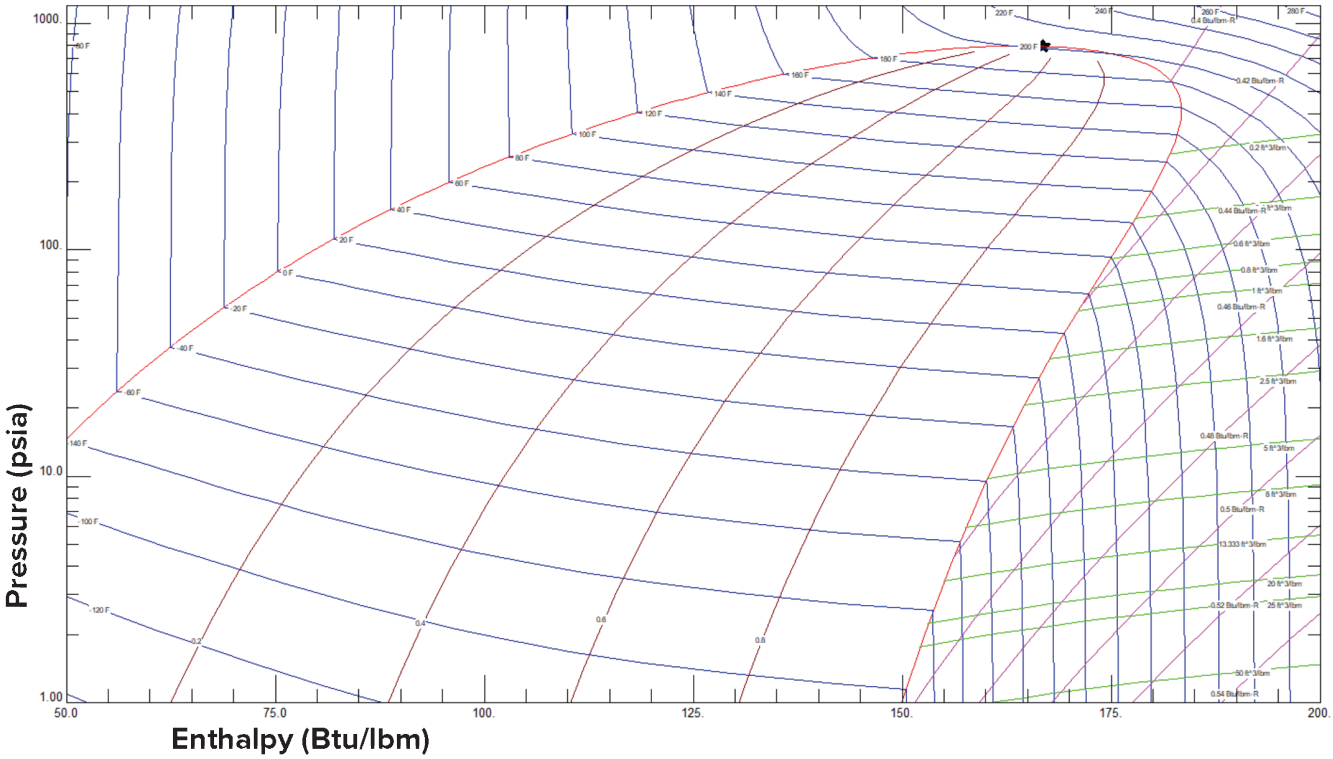
RS-51 (R470B) PRESSURE EMPATHY



Key

Saturation Line

Isotherm

Isochore

Isentrope

Quality