



RS-20 (R480A) BROCHURE

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Replacement for R-134A



GWP (Global Warming Potential) of 291



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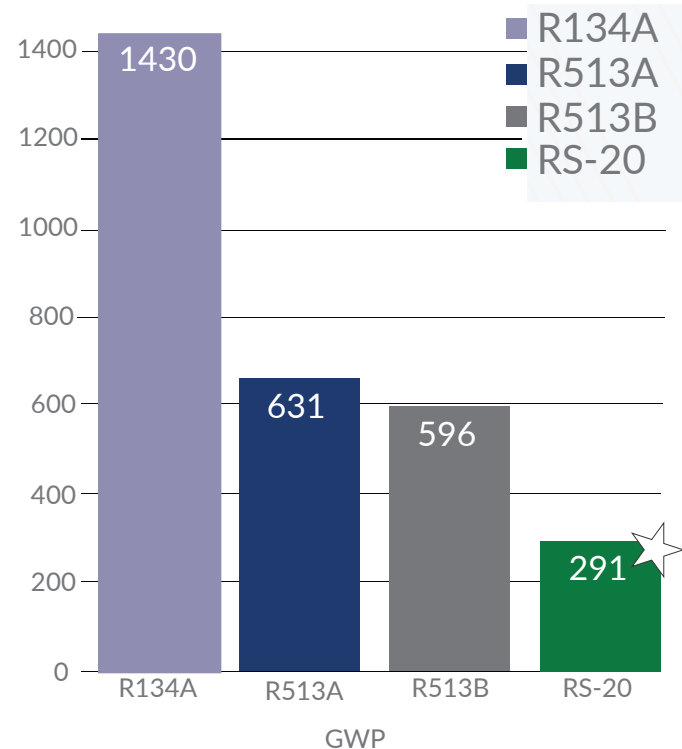
RS-20 (480A) is a R134a Replacement Refrigerant retrofit in Positive Displacement Chillers, Refrigerated Transport, Water Coolers, Commercial Ice Machines, and Cold Storage

RS-20 has a GWP which is 80% lower than R-134A, and less than half that of alternatives such as R513A and R513B. RS-20 can be charged into existing system operating on R-134A without modifications or change of lubricant. RS-20 will enable owners to maintain their chiller and air conditioning systems until the end of their useful life.

APPLICATIONS

RS-20 is suitable to replace R-134A across the board of applications including, but not restricted to, refrigerant transport, cold stores, supermarkets, cellar cooling, dairy cooling, dairy chillers, vending machines. etc.

GLOBAL WARMING POTENTIAL



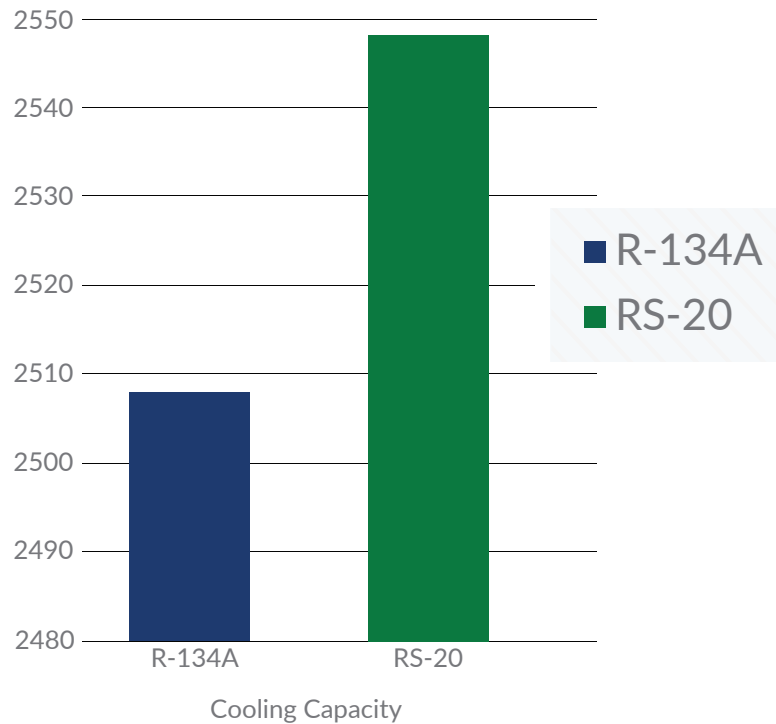
PERFORMANCE CHARACTERISTICS

- Designed specifically to replace R-134A in chiller and air conditioning systems
- No hardware changes needed
- Non-flammable
- Easy to recycle
- Similar discharge pressure & temperature
- Equivalent cooling capacity
- Uses same lubricant as R-134A
- Zero ozone depletion



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COOLING CAPACITY



SAFETY

RS-20 has been independently tested and meets the ASTM 681 test of being non-flammable as formulated. The components of RS-20 have an ASHRAE 'A' toxicity safety classification.

THE ENVIRONMENT

None of the components of RS-20 contains chlorine so that the refrigerant has no ability to deplete the ozone layer. While RS-20 does have a direct GWP (less than 300), this is substantially lower than R-134A and all known alternatives.

SERVICING

Because RS-20 is a blend, the recommendation is to charge the refrigerant into the system in liquid form. A full service and conversation guide is available on request.



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RS-20 (480A) PHYSICAL PROPERTIES

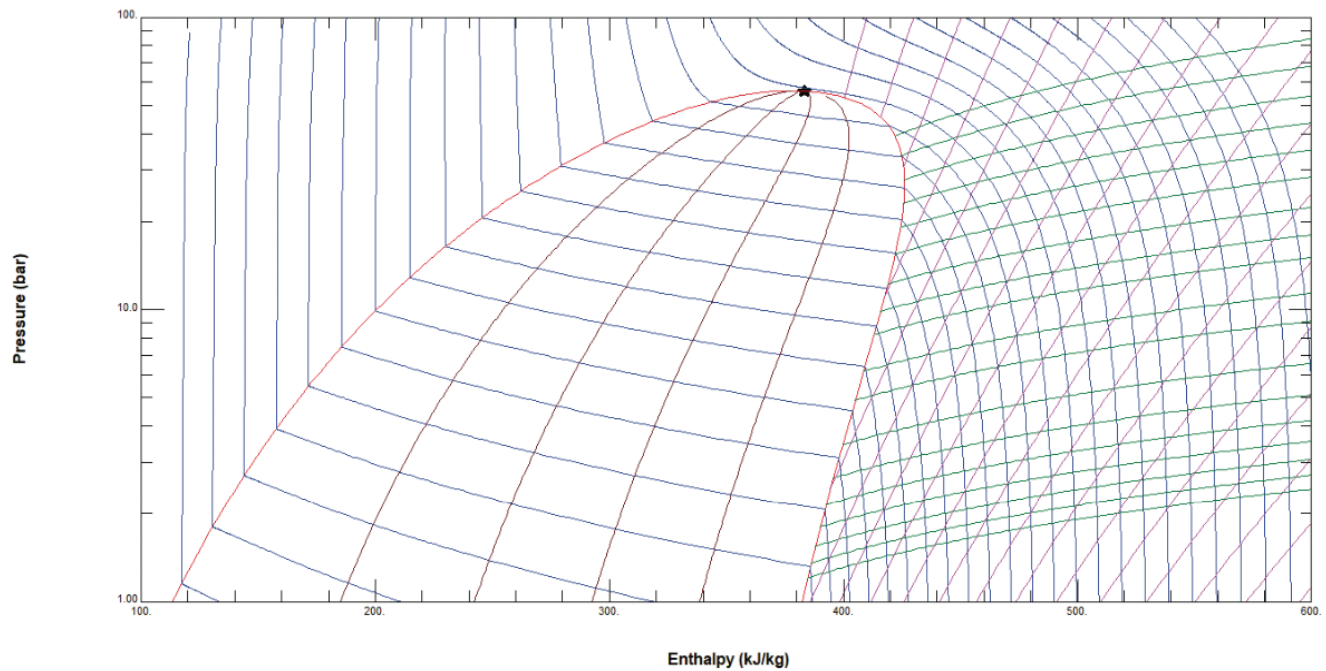
Physical Properties		RS-20 ¹	R-134A
Molecular Weight		108.2	102.0
Boiling Point (1atm) ²	°C	-34.09	-26.07
	°F	-29.37	-14.93
Temperature Glide ³	°C	4.5	0
Critical Temperature	°C	107.4	101.1
	°F	225.3	213.9
Critical Pressure	bara	43.51	40.059
	psia	631.1	581
Liquid Density at 25 °C ⁴	kg/m ³	1175	1207
Density of Saturated Vapour at 25°C ⁵	kg/m ³	28.27	32.35
Specific Heat of Liquid at 25°C	kJ/kg°C	1.391	1.425
Specific Heat of Vapour at 1 atm & 25°C	kJ/kg°C	0.863	0.606
Vapour Pressure at 25°C ⁴	bara	7.517	6.654
	psia	109	96.5
Latent Heat of Vaporisation at Boiling Point ⁵	kJ/kg	229.4	217
Global Warming Potential (GWP) AR4	GWP	291	1430
Flammability Limit in Air (1 atm)	vol%	None	None
Inhalation Exposure (8 hr Day & 40 hi Week)	ppm	1000	1000

1. RS-20 refrigerant properties obtained from NIST's REFPROP program.
2. Boiling point at 1 atm (mean of bubbles and dew points).
3. Typical evaporator temperature glide from Rankine cycle calculations. Midpoints: 45°C condensing, 7°C evaporating with 0.5 bar pressure drop; compressor isentropic efficiency: 0.7.
4. Mean of bubble and dew points at 25°C. Property calculations on the midpoint liquid and vapor compositions as appropriate.
5. Difference between bubble point liquid enthalpy and dew points vapor enthalpy at 1 atm.



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RS-20 (480A) PRESSURE ENTHALPY



Key	
Saturation Line	
Isotherm	
Isochore	
Isentrope	
Quality	