



Mobile Climate Control
On Road



R134a – your best choice

Based on hard facts and figures

9 facts you need to know about R134a

Can I get the same cooling performance with R134a as a system with R407C?

Yes. Any cooling capacity can be obtained from a correctly designed system using any type of refrigerant, given the refrigerant is suitable for the evaporating and condensing temperatures of the application. The coils and the quantity of air moved remain essentially the same. Only the size of the compressor and refrigerant lines need to be designed to match the required capacity.

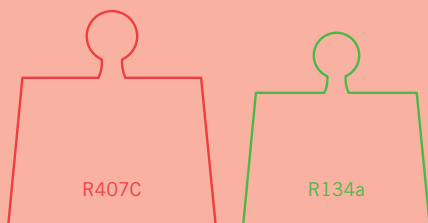
Example:

MCC Eco 353 series using R134a
and a 6TFC Bitzer compressor113 k Btu/hr (33 kW)
Standard market available unit using R407C
under same rating conditions113 k Btu/hr (33 kW)

Equal cooling performance!

Will my R134a system weigh less than an R407C equipped system of the same capacity?

Yes. System weight will vary by construction and options. This is much more of a factor in system weight than refrigerant.



Example: Eco 353 roof mounted AC unit with R134a weight 450 lb (204 kg) with Bitzer 6TFC compressor weight – 113 lb (51.5 kg). The equivalent capacity roof unit on the market with R407C weight 513 lb (233 kg) and piston compressor weight – 115 lb (52.2 kg).

Lower weight!

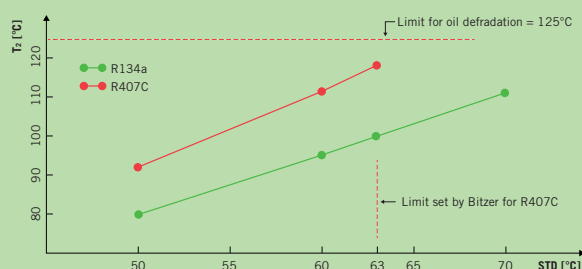
Will I be able to replace my R134a if it's ever phased out in the future?

Yes, there is an identified replacement for R134a, HFO1234yf, which GM will use. The future for R407C is uncertain. Other things to consider; R407C is a blend which requires total change replacement after 50% loss of charge; this also limits the reuse of refrigerant on site and the recycling of the used refrigerant.

Future proof!

Will my system run lower temperature with R134a?

Yes. With air-conditioning systems that are similarly optimized, the compressor discharge temperature in an R134a system shall be 18–30 °F (10–17 °C) lower than that in an R407C system.



Lower temperature!

Is R134a less expensive per pound?

Yes.

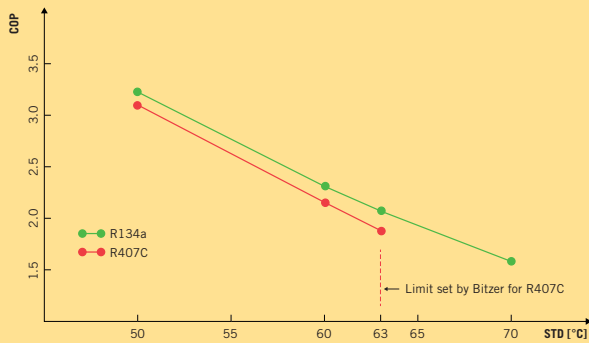
Example: Recent price quote per 1000 lb cylinder at a major refrigerant distributor

R134a: \$5,875/1000 lbs (\$5.88/lb)
R407C: \$12,000/1000 lbs (\$12/lb)

Best economic choice!

Is R134a a more energy efficient refrigerant?

Yes. With air-conditioning systems that are similarly optimized, R134a is more energy-efficient than R407C. This fact is explained by the below graph and is demonstrated by the calculation of both cycles using the data and tools published by the leading refrigerant manufacturer – DuPont. The chart shows the relationship between COP (coefficient of performance) and condensing temperature. The green line represents the curve for R134a and the red the one for R407C.



Saves more fuel!

Will I use less fuel with a properly designed R134a system as compared to one running with R407C?

Yes, an optimized R134a system when compared to a similarly optimized R407C system shall consume less fuel to produce the same cooling capacity. That difference becomes even greater when the ambient temperature or the load on the unit increases beyond the design point. However, a sub-optimised system will always consume more fuel no matter what the refrigerant. This is illustrated in the following chart which shows some system examples.

	R407C (optimized)	R134a (optimized)
Cooling Capacity [kW]	28.0	28.0
(Btu/hr)	(95560)	(95560)
Compressor Power [kW]	9.63	8.70
(HP)	(13.1)	(11.8)
COP	2.91	3.21
(Btu/hr per HP)	(7295)	(8098)

More efficient!

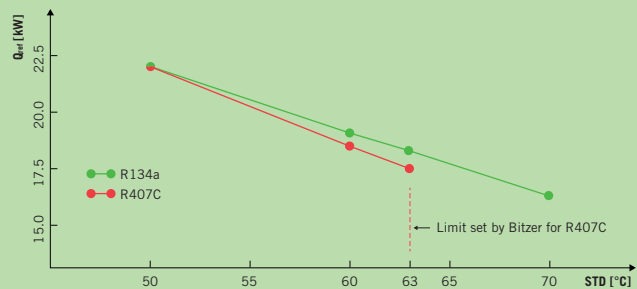
What is the best refrigerant for high ambient temperature?

It is R134a. Common refrigeration oils have an ultimate service temperature of around 265°F (125°C) after which oil degradation is unavoidable.

As the ambient temperature increases, the condensing temperature (STD-Saturated Discharge Temperature) has to follow. This increase in condensing temperature shall be accompanied with an even bigger increase in compressor discharge temperature (T2) that shall reach the oil degradation temperature far before an R134a system will. The below chart represents the relationship for both refrigerants where the red line is the curve for R407C and the green for R134a.

That fact explains why compressor manufacturers limit the condensing temperature for R407C to around 145–150°F (60°C–65°C) whereas for R134a compressors, the top limit for condensing temperature is 158–175°F (70–80°C) for air conditioning applications.

Another reason why R134a is the choice refrigerant for high ambient is that in air-conditioning systems that are similarly optimised to deliver the same cooling capacity, an R407C system shall lose more cooling capacity than an R134a when the ambient temperature increases beyond the design point. This at the time when the cooling capacity is most needed.



Better temperature capacity!

Is R134a a more environmentally friendly refrigerant?

Yes.

GWP (Global Warming Potential) Value:

R134a 1300

R407C 1653

Both refrigerants have 0 ODP (Ozone depleting potential)

Lower GWP-value!

Use less fuel. Spend less money. Have less impact on the environment.

Another step on the road towards a better climate

We know and understand that our business - to provide exceptional performance in mobile climate comfort by supplying custom engineered and manufactured HVAC solutions – impacts the environment. With the aim to manage this impact at processing and at use of our products we actively strive to minimize the usage of resources and other negative environmental impact in the entire supply chain and to optimize their performance and energy consumption when used in our customer's end products.

Our environmental work is based on our employees having an open mind and assuming ownership of the actual situation.



Mobile Climate Control

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