

RS-24

New Zero ODP Drop-in
Replacement for R12

No oil change required
Compatible with all lubricants

The easy and long-term solution
to replacing R12



from

REFRIGERANT SOLUTIONS LIMITED

The Refrigerant Specialists



RS-24

The new Zero ODP Drop-in Refrigerant

- Suitable for all applications including mobile air conditioning
- No need to change the existing lubricant avoiding expensive retrofit
- Avoids risks associated with a 'dirty retrofit' using R134a and mineral oil.
- The use of RS-24 enables oil return to the compressor
- No hardware changes required
- Avoids the use of hygroscopic and costly synthetic lubricants
- Lower discharge temperatures
- Zero Ozone Depletion Potential
- Non-flammable
- An almost perfect performance match to replace R12 in vehicle air conditioning
- Available in returnable and disposable cylinders
- Suitable for new and existing plant and equipment
- Easy to recycle

Drop-in and long-term R12 replacement

RS-24 is an easy-to-use Drop-in replacement for R12. There is no need to change the existing lubricant in the system, thereby avoiding a costly retrofit. RS-24 also provides a long term solution to replacing R12 in most applications such as hermetic and semi-hermetic systems, domestic refrigerators, refrigerated transport, cold stores, cellar cooling, dairy chillers, vending machines and including mobile air conditioning.

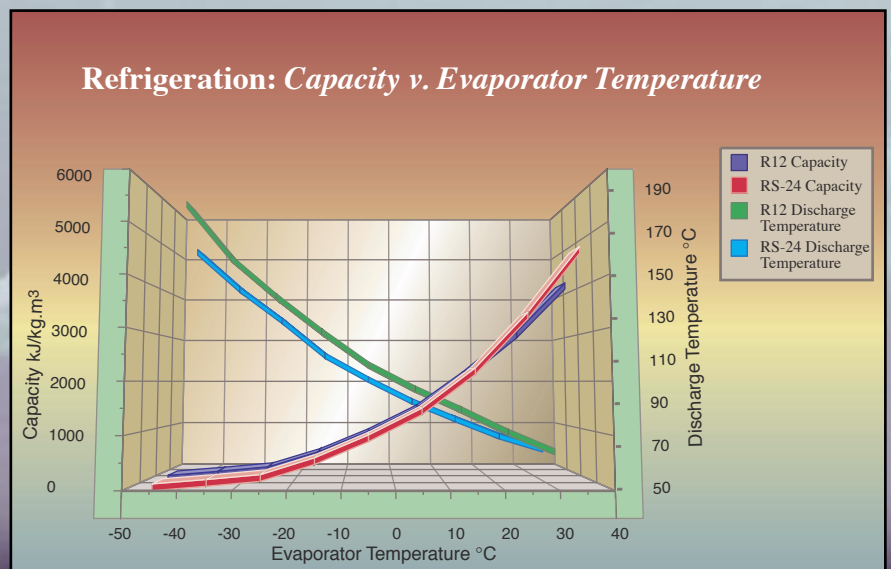
The properties of RS-24 make it an almost perfect match for R12 with its compatibility for traditional and synthetic lubricants, similar performance, lower discharge temperature, non-flammability and relatively short atmospheric lifetime. Performance relative to R12 is illustrated in charts 1, 2 and 3. It is this combination of properties which makes RS-24 unique as a replacement for R12 on the market today.

Lubricants

RS-24 can be used safely with both the traditional and new synthetic lubricants, and consequently there is no need to change the oil when replacing R12.

RS-24 eliminates the risk of a compressor burn-out which can occur by simply replacing R12 with R134a without reducing the mineral oil content in the system to the recommended maximum 5%. The solubility of RS-24 in mineral oil enables oil return to the compressor.

Chart 1



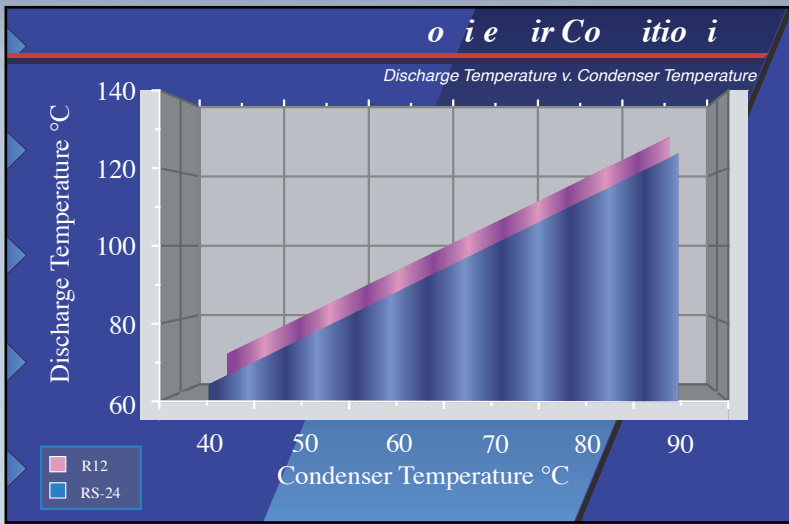


Chart 2

Existing Equipment

RS-24 can be charged into a refrigeration or air conditioning system previously operating on R12 without changing the oil or making any alterations to the equipment. Because RS-24 has a lower density than R12 (and R134a), less product is required than the R12 it replaces (typically 90%).

With its ability to use traditional and synthetic lubricants, RS-24 makes a replacement the R12 in all applications simple, straightforward and cost effective. RS-24 should not be added to a system which still contains R12.

New Equipment

RS-24 is also suitable for use in new equipment as a zero ODP replacement for R12.

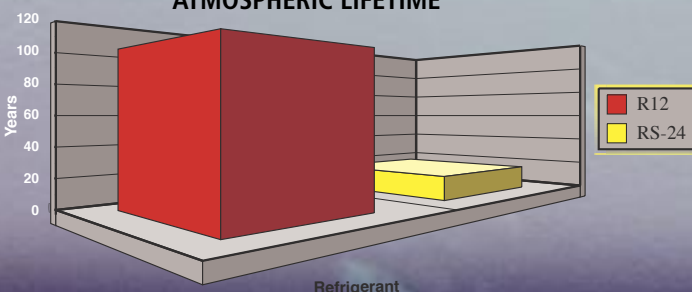
Avoiding the use of expensive and hygroscopic lubricants reduces costs and significantly reduces the risk of ingress of moisture into the system.

The Environment

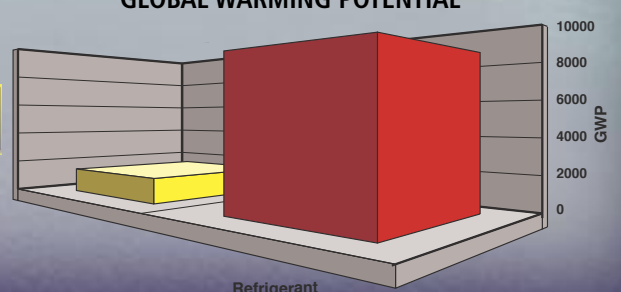
None of the components of RS-24 contains chlorine so that the refrigerant has no ability to deplete the ozone layer.

As is the case with all hydrofluorocarbons (HFCs), RS-24 does have a direct global warming potential (GWP), but this is counterbalanced by its lower Total Equivalent Warming Impact (TEWI) than R12. RS-24 has a relatively short atmospheric lifetime of approximately 15 years which is at the lower end of the main HFCs available today and compares to 102 years in the case of R12.

ATMOSPHERIC LIFETIME



GLOBAL WARMING POTENTIAL



Safety

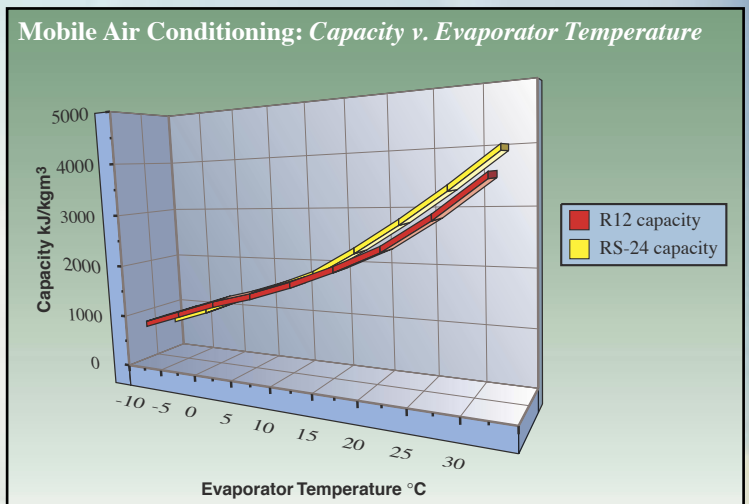
RS-24 has been independently tested and meets the ASTM 681-98 test of being non-flammable as formulated.

The components of RS-24 have been subjected to toxicity tests carried out by the Programme for Alternative Fluorocarbon Toxicology (PAFT) and have been declared to be of low toxicity. Health and safety data is available on request.

Servicing

Because RS-24 is a blend, the recommendation is to charge the refrigerant into the system in liquid form. A full service and conversion guide is available on request.

Chart 3

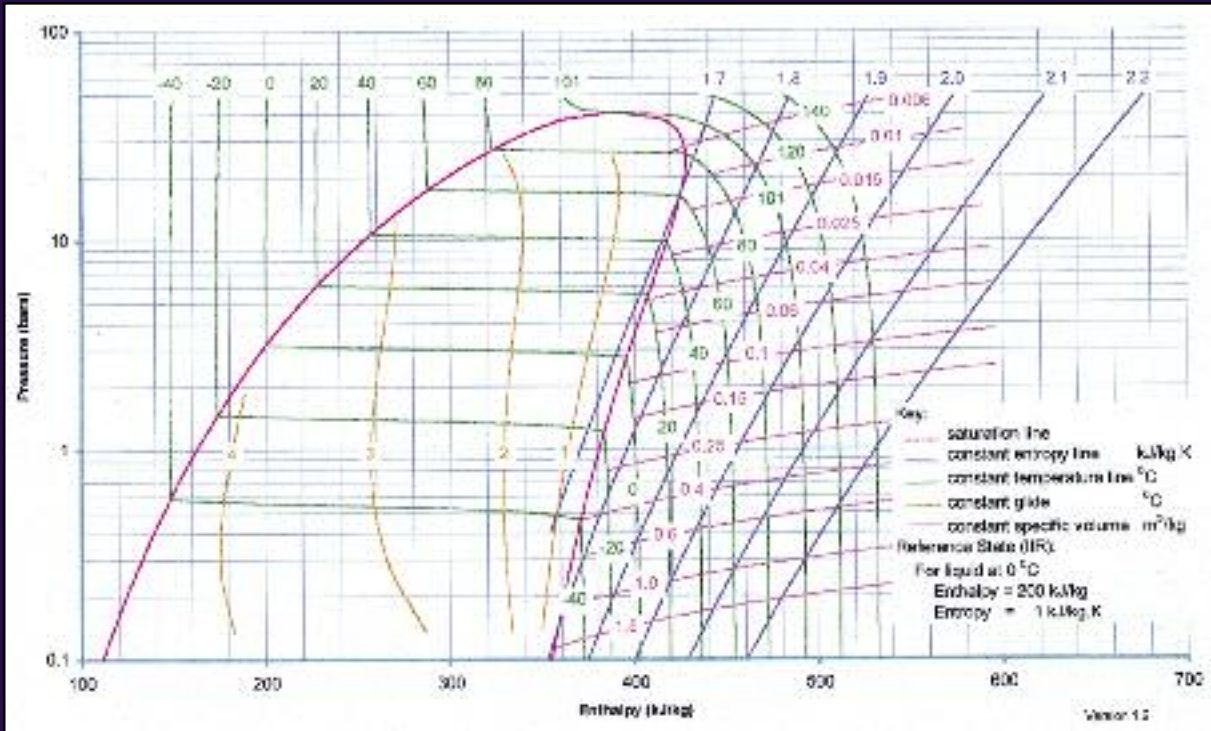


RS-24 in Low Temperature Refrigeration

Under certain circumstances, at low evaporator temperatures, poor oil miscibility can result in problems with compressor lubrication. At evaporator temperatures below -20°C, migration of oil to the evaporator can result in a lack of lubrication in the compressor. If such conditions apply, then the recommendation is to change to a polyol ester lubricant to facilitate oil return to the compressor. There is no need to drain all the existing oil from the system. Simply remove as much of the mineral oil charge as is practicable and refill to the appropriate level using POE lubricant.



RS-24 Pressure-enthalpy Chart



RS-24 Physical Properties

		RS-24	R12
Molecular Weight		102.6	120.9
Boiling Point (1 atm)	°C	-28.6 ⁽¹⁾	-29.8
	°F	-19.5 ⁽¹⁾	-21.6
Temperature glide	°C	4	0
Critical temperature	°C	101.0	112.0
	°F	213.8	233.6
Critical pressure	kPa	4097	4116
	psia	594	597
Liquid density at 25°C	kg/m ³	1184	1311
Density of saturated vapour at 25°C	kg/m ³	30.9	37.3
Specific heat of liquid at 25°C	kJ/kg°C	1.45	1.00
Specific heat of vapour at 1 atm and 25°C	kJ/kg°C	0.863	0.606
Vapour pressure at 25°C	kPa	707 ⁽¹⁾	643
	psia	102.6 ⁽¹⁾	93.3
Latent heat of vaporisation at boiling point	kJ/kg	218	165
Ozone Depletion Potential	ODP	0	1
Flammability limit in air (1 atm)	vol%	None	None
Inhalation exposure (8hr day and 40hr week)	ppm	1000	1000

⁽¹⁾ Bubble point



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