



# RS-45 (R434A): Q & A

1.Q: What is RS-45

A: RS-45 is a non ozone depleting Drop-in replacement for R22 in most applications.

2 Q: Yes, but what does RS-45 contain?

A: RS-45 is a blend of R143a, R125, R134a and isobutane.

3.Q: Is RS-45 subject to a phase out programme under any regulations as is the case with CFCs and HCFCs?

A: No. None of the components of RS-45 is subject to a phase out schedule under the Montreal protocol or any regulations.

4 Q: Can RS-45 be used with mineral and alkylbenzene lubricants?

A: Yes. There is no need to change to a synthetic polyol ester (POE) oil with RS-45 which operates satisfactorily with traditional lubricants.

5 Q: What is the temperature glide of RS-45?

A: 1.5°C

6.Q: Is RS-45 non flammable and non toxic?

A; RS-45 is both non flammable and non toxic. RS-45 is non flammable under all conditions of fractionation under ASTM 681-98.

7 Q: Is RS-45 approved by compressor manufacturers?

A: The individual components which comprise RS-45 are widely used in compressors produced by major manufacturers.

8 Q: What is the compression ratio of RS-45?

A: High compression ratios can result in increased energy expenditure and the potential for compressor damage. RS-45 has a compression ratio which matches R22 across the range of applications where R22 is commonly found

9 Q: Can RS-45 be used to top up a system containing R22?

A: The standard recommendation is not to mix refrigerants. RS-45 does not form an azeotropic mixture with R22 so that adding RS-45 to R22 in a system will not generate any higher pressures..

10 Q: Is RS-45 as efficient as R22?

A: Tests show that RS-45 has a higher Coefficient of Performance than R22 and hence is considered to be more energy efficient than R22.

11 Q: What trials have been carried out on RS-45 and what are the results?

A: RS-45 has shown comparable results to R22 in systems where an expansion device is present. RS-45 is particularly effective at low temperatures. The results show good oil return to the compressor.

12 Q: Does RS-45 need to be charged in the liquid or gaseous form?

A: Because RS-45 is a blend, the recommendation is to charge it into the system in the liquid form. However, if the entire contents of the cylinder are being charged, then vapour charging is acceptable.

13 Q: Does the RS-45 disposable cylinder have a dip tube?

A: No. The disposable should be inverted to discharge RS-45 in the liquid form.

14 Q: Is RS-45 on the SNAP (Significant New Alternative Policy programme) list in the USA?

A: Yes.

15 Q: Does RS-45 have an ASHRAE number & what is its classification?

A: Yes. RS-45 has been designated an ASHRAE number of R434A with a classification of A1, which is low toxicity & non flammable under all conditions of fractionation.

16 Q: How does the pressure rating of RS-45 compare with R22?

A: The discharge pressure of RS-45 is slightly higher than R22 and similar to R407C.

17 Q: How does the capacity of RS-45 compare to R22?

A: The capacity of RS-45 matches R22 from high to low temperatures across the temperature range where R22 is commonly found.

18 Q: How does the temperature rating of RS-45 compare to R22?

A: The discharge temperatures of RS-45 are considerably lower than R22.

19 Q: What are the flammability characteristics of RS-45?

A: RS-45 is non flammable at room temperature and atmospheric pressure, and has the same classification as R12, R134a, R404A, R409A (FX56), R507 (AZ-50) etc.

20 Q: What are the decomposition products resulting from the combustion of RS-45?

A: The decomposition products resulting from subjecting RS-45 to a high temperature source are similar to those when R22 is exposed to fire conditions. The decomposition products in each case are irritating and toxic, and breathing apparatus should be worn where a possibility to exposure exists.

21 Q: Are there any special precautions with RS-45?

A: There are no specific precautions which must be taken with RS-45. As with all refrigerants, common sense and good housekeeping is always recommended. Because the use of hygroscopic synthetic POE lubricants are avoided with RS-45, scrupulous attention to preventing moisture contamination is not necessary, although the ingress of moisture should be avoided at all times.

22 Q: Is RS-45 compatible with refrigeration and air conditioning systems designed for R22?

A: Yes. RS-45 is compatible with all materials commonly used in systems that were designed and charged with R22. As in the case of R22, magnesium and zinc alloys should be avoided.

23 Q: Can RS-45 be recovered and recycled?

A: Yes. RS-45 can be recovered and re-used after a cleaning process such as reclamation.

24 Q: What technical guidance do you advise when changing from R22 to RS-45?

A: The procedure for converting from R22 to RS-45 is straightforward. Use the same type of lubricant, replace the filter/drier and charge approximately the same quantity of RS-45 as the original R22 charge after fully evacuating.

25 Q: How does RS-45 compare in price with R407C and other alternatives?

A: RS-45 is competitive in price with other R22 alternatives.

26 Q: What is the main advantage of RS-45?

A: RS-45 has a low glide (one third of R407C) and avoids all the problems associated with a high glide refrigerant, eg icing up of the evaporator, fractionation of the blend leading to higher pressures in the condenser, a limited application range etc. RS-45 is a suitable replacement for R22 across the range of temperatures where R22 is commonly found at high and low temperatures. RS-45 can be used to replace R22 without the need to change the original mineral oil in the system. There is, therefore, no necessity to retrofit to a synthetic lubricant such as POE.

27 Q: Is RS-45 compatible with hoses, seals, gaskets and O-rings commonly used with R22?

A: RS-45 (R434A) is compatible with materials commonly used in refrigeration systems previously charged with R22. In general, materials which are compatible with R22 can be used with RS-45 (R434A). It is recommended to check equipment manufacturer's retrofit literature and obtain recommendations from equipment manufacturers with regard to materials' compatibility. In older systems which have been operating on R22 for many years, replacement of some seals may be required due to the different composition of RS-45 (R434A) which contains HFCs.

28 Q: How does the Coefficient of Performance (COP) of RS-45 compare with R22?

A: Tests show that RS-45 provides a higher COP than R22 depending upon the application and equipment.

29 Q: What is the specification for RS-45?

A: RS-45 complies with the refrigerant specification ARI 700 for fluorocarbon refrigerants.

30 Q: What is the effect of high exposure by inhalation of RS-45?

A: As is the case with all CFC, HCFC and HFC based refrigerants, high exposure to RS-45 may produce anaesthetic effects. Very high exposures may cause an abnormal heart rhythm and prove suddenly fatal as is the case with all CFC, HCFC and HFC based refrigerants.

31 Q: What is the flash point, flammability explosion limits and auto-ignition temperature for RS-45?

A: RS-45 is non flammable as defined in the ASHRAE EN 681-98 test, and hence does not have a flash point or explosion limits. The auto-ignition temperature of RS-45 has not been determined but is expected to be greater than 750°C.

32: Can RS-45 be used in flooded evaporators, in systems with liquid receivers and in centrifugal compressors?

A: Tests continue in this application and the results are encouraging. RS-45 is suitable for use in flooded systems.

33: What types of leak detectors should be used with RS-45?

A: Leak detectors used with HFCs are suitable for use with RS-45.

34: What would be the effect of a large release of RS-45?

A: In common with other refrigerants of this type, the area should be immediately evacuated. The vapour may concentrate at floor level and in poorly ventilated areas may be slow to disperse. Forced ventilation should be provided before entering such areas.

35 Q: Is RS-45 available in both returnable and disposable cylinders:

A: Yes.

36: Can RS-45 be used in systems designed to replace R22 and initially charged with a hydrocarbon?

A: Although no development work has been carried out on hydrocarbon systems designed to replace R22, we believe that RS-45 would be suitable but an increased refrigerant charge would be required.

37: Is RS-45 suitable for use with new equipment?

A: RS-45 has the potential to replace R22 in new equipment because it has a capacity which matches R22 at high and low temperatures, low discharge temperature, can be used with traditional lubricants, a low temperature glide, zero ODP and is energy efficient.