

# Cool50 Q & A

a better alternative™

## Q1: What is Cool50?

A1: Cool50 is a non-ozone depleting replacement for R22 in most applications.

## Q2: What does Cool50 contain?

A2: Cool50 is a blend of HFC134a, HFC125, iso-pentane, n-butane, and isobutane.

## Q3: Does Cool50 have an ASHRAE number and what is its classification?

A3: Yes. It has been designated an ASHRAE number of R424A with a classification of A1, which is low toxicity and nonflammable under all conditions of fractionation.

## Q4: Is Cool50 subject to a phase-out program under any regulations as is the case with CFCs and HCFCs?

A4: No. None of the components of Cool50 are subject to a phase-out schedule under the Montreal protocol or any regulations.

## Q5: How is Cool50 different from ISCEON 59/MO59 (R417A)?

A5: Cool50 is a different blend from R417A with a higher capacity and additionally contains a combination of iso-pentane, n-butane, and isobutane which provides optimum oil return to the compressor while remaining nonflammable as formulated.

## Q6: Can Cool50 be used with mineral and alkylbenzene lubricants?

A6: Yes. There is no need to change to a synthetic polyol ester (POE) oil with Cool50 which operates satisfactorily with traditional lubricants.

## Q7: Is Cool50 approved by compressor manufacturers?

A7: The individual components which comprise Cool50 are widely used in compressors produced by major manufacturers.

## Q8: Can Cool50 be used to top up a system containing R22?

A8: The standard recommendation is not to mix refrigerants. Cool50 does not form an azeotropic mixture with R22 so that adding Cool50 to R22 in a system will not generate any higher pressures. In strictly technical terms, work has shown that Cool50 may be added to R22 without any adverse effects.

## Q9: Can Cool50 be added to ISCEON 59/MO59 (R417A)?

A9: There is not sufficient experience in the field to be able to comment. It is recommended that MO59 is recovered from the system and replaced with Cool50.

## Q10: Can Cool50 be used in refrigeration as well as air conditioning?

A10: Cool50 was designed as a replacement for R22 in existing air conditioning equipment without replacing the mineral oil lubricant. At lower temperatures Cool50 is the preferred alternative to R22.

## Q11: Is Cool50 as efficient as R22?

A11: Tests show that Cool50 has a higher coefficient of performance

than R22 and hence is considered to be more energy efficient than R22.

## Q12: What trials have been carried out on Cool50 and what are the results?

A12: Case studies on Cool50 have been carried out in a range of applications commonly occupied by R22 including window air conditioning, chilled food, and commercial heat pumps in both heating and cooling modes. The results show good oil return to the compressor in all cases and a high COP.

## Q13: What is the glide of Cool50?

A13: A calculation based on a typical air conditioning cycle gives evaporator and condenser glides of approximately 3°C. It has been demonstrated in tests that Cool50 is an excellent replacement for R22 in a variety of air conditioning equipment and that the refrigerant glide does not adversely affect its performance. It is considered that glide values, calculated from the properties of a zeotropic refrigerant, do not necessarily reflect the glides observed in a real unit. For example, for R22 a pressure drop of 0.5 bar in a DX evaporator will induce a glide of 2.8°C. In contrast a similar pressure will induce a glide of only 0.8°C with Cool50. This apparently paradoxical result occurs because the glide resulting from the composition change of Cool50 works opposite to the glide due to the pressure drop tending to cancel it out.

## Q14: Does Cool50 need to be charged in the liquid or gaseous form?

A14: Because Cool50 is a blend, the recommendation is to charge it into the system in the liquid form.

## Q15: Does the Cool50 disposable cylinder have a dip tube?

A15: No. The disposable should be inverted to discharge Cool50 in the liquid form.

## Q16: Is Cool50 on the SNAP (Significant New Alternative Policy Program) list in the USA?

A16: Yes. R424A is approved by the US Environmental Protection Agency as a replacement for R22 and is on the SNAP list.

## Q17: How does the pressure rating of Cool50 compare with R22?

A17: The discharge pressure of Cool50 is lower than R22.

## Q18: How does the capacity of Cool50 compare to R22?

A18: Tests have been carried out with Cool50 in a variety of air conditioning units under realistic operating conditions. In all cases the cooling performance of Cool50 was indistinguishable from that of R22 working in the same equipment under comparable conditions. Preliminary calculations based on a simplified cycle suggested that the refrigeration capacity of Cool50 might be lower than that of R22 under similar conditions. In practice this is not supported by the results from real equipment confirming that cooling capacity is determined by a number of factors which cannot be readily included in simple calculations.

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**Q19: How does the temperature rating of Cool50 compare to R22?**

A19: The discharge temperatures of Cool50 are considerably lower than R22.

**Q20: What are the flammability characteristics of Cool50?**

A20: Cool50 is nonflammable at room temperature and atmospheric pressure, and has the same classification as R22, R134a, R404A, R409A (FX56), R507 (AZ-50), etc.

**Q21: What are the decomposition products resulting from the combustion of Cool50?**

A21: The decomposition products resulting from subjecting Cool50 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 of exposure exists.

**Q22: Are there any special precautions with Cool50?**

A22: There are no specific precautions which must be taken with Cool50. As with all refrigerants, common sense and good housekeeping are always recommended. Because the use of hygroscopic synthetic POE lubricants is avoided with Cool50, scrupulous attention to preventing moisture contamination is not necessary, although the ingress of moisture should be avoided at all times.

**Q23: Is Cool50 compatible with refrigeration and air conditioning systems designed for R22?**

A23: Yes. Cool50 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.

**Q24: Can Cool50 be recovered and recycled?**

A24: Yes. Cool50 can be recovered in the same way as other refrigerants.

**Q25: What technical guidance do you advise when changing from R22 to Cool50?**

A25: The procedure for converting from R22 to Cool50 is straightforward. Use the same type of lubricant, replace the filter/drier with an HFC-compatible one, and charge approximately the same amount of Cool50 as the original R22 charge after fully evacuating.

**Q26: How does Cool50 compare in price with R407C and other alternatives?**

A26: Cool50 is competitive in price with other R22 alternatives.

**Q27: What is the main advantage of Cool50?**

A27: Cool50 is a long-term alternative for R22, and its main advantage is that it 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.

**Q28: Is Cool50 compatible with hoses, seals, gaskets, and O-rings commonly used with R22?**

A28: Yes. Because the original mineral oil is being used and not a synthetic lubricant, elastomers and plastics used with R22 are compatible with Cool50.

**Q29: How does the coefficient of performance (COP) of Cool50 compare with R22?**

A29: Tests show that Cool50 provides a higher COP than R22

depending upon the application and equipment.

**Q30: What is the specification for Cool50?**

A30: Cool50 complies with the refrigerant specification AHRI 700-2012 for fluorocarbon refrigerants.

**Q31: What is the effect of high exposure by inhalation of Cool50?**

A31: As is the case with all CFC-, HCFC- and HFC-based refrigerants, high exposure to Cool50 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.

**Q32: What is the flash point, flammability explosion limits, and autoignition temperature for Cool50?**

A32: Cool50 is nonflammable as defined in the ASHRAE EN 681-98 test, and hence does not have a flash point or explosion limits. The autoignition temperature of Cool50 has not been determined but is expected to be greater than 750°C.

**Q33: How does Cool50 compare with ISCEON/MO59 (R417A) in terms of efficiency?**

A33: Cool50 has a higher capacity than ISCEON/MO59 (R417A) and a similar coefficient of performance.

**Q34: Can Cool50 be used in flooded evaporators, in systems with liquid receivers, and in centrifugal compressors?**

A34: Cool50 is suitable for use in flooded evaporators and should be used in this application.

**Q35: What types of leak detectors should be used with Cool50?**

A35: Leak detectors used with HFCs are suitable for use with Cool50.

**Q36: What would be the effect of a large release of Cool50?**

A36: In common with other refrigerants of this type, the area should be immediately evacuated. The vapor may concentrate at floor level and in poorly ventilated areas may be slow to disperse. Forced ventilation should be provided before entering such areas.

**Q37: How does Cool50 compare to ISCEON/MO59 (R417A) in terms of GWP?**

A37: Cool50 has a similar GWP to ISCEON/MO59 (R417A).

**Q38: Is Cool50 available in returnable cylinders?**

A38: Yes. We offer Cool50 in 110 lb., 850 lb. and 1,450 lb. returnable cylinders.

**Q39: Can Cool50 be used in systems designed to replace R22 and initially charged with a hydrocarbon?**

A39: Although no development work has been carried out on hydrocarbon systems designed to replace R22, we believe that Cool50 would be suitable but an increased refrigerant charge would be required.

**Q40: Is Cool50 suitable for use with new equipment?**

A40: Cool50 has a zero ODP, a relatively low GWP, a higher coefficient of performance, significantly lower discharge temperatures and pressures than R22, and a lower temperature glide and pressure than R407C. Cool50 is a candidate for use by original equipment manufacturers but consideration should also be given to the use of Cool50 and/or R428A in new equipment.

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