

# RS-51: Q & A (R470B)



1.Q: What is RS-51?

A: RS-51 is a non-ozone depleting, very low GWP replacement for R404A and R507.

2.Q: What is the Global Warming Potential of RS-51?

A: The GWP of RS-51 is 717.

3.Q: Yes, but what does RS-51 contain?

A: RS-51 is a blend of R125, CO<sub>2</sub>, R1234ze, R227ea, R32, R134a.

4.Q: Does RS-51 have an ASHRAE number & what is its classification?

A: Yes, ASHRAE number for RS-51 is R470B and has a safety classification of A1, i.e. low toxicity & non-flammable under all conditions of fractionation.

5.Q: Is RS-51 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-51 is subject to a phase out schedule under the Montreal Protocol or any regulations.

6.Q: Can RS-51 be used with the same lubricant when replacing R404A and R507?

A: Yes. RS-51 is fully compatible with synthetic lubricants such as polyol ester (POE) which are commonly used with R404A and R507.

7.Q: Is RS-51 non-flammable and non-toxic?

A; RS-51 is both non-flammable and non-toxic.

8.Q: Is RS-51 approved by compressor manufacturers?

A: The individual components which comprise RS-51 are widely used in compressors produced by major manufacturers.

9.Q: What trials have been carried out on RS-51 and what are the results?

A: Trials have been carried out which show that RS-51 has a similar performance to R404A including energy efficiency and cooling capacity.

10.Q: Does RS-51 need to be charged in the liquid or gaseous form?

A: Because RS-51 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.

11.Q: Does the RS-51 disposable cylinder have a dip tube?

A: No. The disposable should be inverted to discharge RS-51 in the liquid form.

12.Q: How does the pressure rating of RS-51 compare with R404A and R507?

A: Similar to R404A and R507

13.Q: How does the capacity of RS-51 compare to R404A and R507?

A: Similar to R404A and R507.

14.Q: How does the temperature rating of RS-51 compare to R404A and R507?

A: The discharge temperature of RS-51 is similar to R404A.

15.Q: What are the flammability characteristics of RS-51?

A: RS-51 is non-flammable at room temperature and atmospheric pressure, and has the same classification as R22, R134a, R404A, R409A (FX56), R507 (AZ-50) etc.

16.Q: What are the decomposition products resulting from the combustion of RS-51?

A: The decomposition products resulting from subjecting RS-51 to a high temperature source are similar to those when R404A and R507 are 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.

17.Q: Are there any special precautions with RS-51?

A: There are no specific precautions which must be taken with RS-51. As with all refrigerants, common sense and good housekeeping is always recommended.

18.Q: Is RS-51 compatible with refrigeration and air conditioning systems designed for R404A and R507?

A: Yes. RS-51 is compatible with all materials commonly used in systems that were designed and charged with R404A and R507. Magnesium and zinc alloys should be avoided.

19.Q: Can RS-51 be recovered and recycled?

A: Yes. RS-51 can be recovered and re-used after a cleaning process such as reclamation.



20.Q: What technical guidance do you advise when changing from R404A or R507 to RS-51?

A: Use the same type of lubricant which will be polyolester, replace the filter/drier and charge 10% less quantity of RS-51 as the original charge for R404A or R507 after fully evacuating. For optimum performance it is recommended to replace the expansion device with a valve commonly used with R134a.



21.Q: How does RS-51 compare in price with R404A and R507?

A: RS-51 is competitive in price with R404A and R507.

22.Q: What is the main advantage of RS-51?

A: RS-51 has a Global Warming Potential which is less than a quarter that of R404A and R507 which results in a lower carbon footprint. RS-51 also has a GWP which is 45% less than R448A or R449A.

23.Q: Is RS-51 compatible with hoses, seals, gaskets and O-rings commonly used with R404A and R507?

A: Yes, there is no necessity change any seals, hoses etc when replacing R404A and R507 with RS-51.

24.Q: What is the specification for RS-51?

A: RS-51 complies with the refrigerant specification AHI 700 for fluorocarbon refrigerants.

25.Q: What is the effect of high exposure by inhalation of RS-51?

A: As is the case with all CFC, HCFC and HFC based refrigerants, high exposure to RS-51 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.

26.Q: What is the flash point, flammability explosion limits and auto-ignition temperature for RS-51?

A: RS-51 is non-flammable as defined in the ASHRAE EN 681-09 test, and hence does not have a flash point or explosion limits. The auto-ignition temperature of RS-51 has not been determined but is expected to be greater than 750°C.

27.Q: What types of leak detectors should be used with RS-51?

A: Leak detectors used with HFCs are suitable for use with RS-51.

28.Q: What would be the effect of a large release of RS-51?

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.

29.Q: Is RS-51 available in both returnable and disposable cylinders?

A: Yes.

30.Q: Is RS-51 suitable for use with new equipment?

A: RS-51 is targeted to replace R404A and R507 in new equipment in order to take advantage of its considerably lower global warming than R404A and R507.

31.Q: Why is the discharge temperature lower than that predicted by computer models such as Refprop?

A: Computer models including Cycle D do not reflect the actual practical discharge temperature of RS-51 which has been found in practice to be similar to R404A, R448A, R449A & other blends.

32.Q: Does RS-51 have a temperature glide?

A: Owing to a pressure drop in the evaporator, the glide is reduced to approx. 4K.

