

# **RS-53 (470A) PHYSICAL PROPERTIES AND RETROFIT PROCEDURE**

Description	
Type HFC Replacement Drop-in or Long Term	HFC blend R410A Both POE
ODP GWP 100 year ITH	Zero 909
500 year ITH	306

RS-53 (470A) Physical Properties		RS-53 <sup>2</sup>	R-410A
Molecular Weight		84.43	72.6
Boiling Point (1atm) <sup>1</sup>	℃ °F	-62.5 -80.4	-51.4 -60.5
Surface Tension (25°C) <sup>1</sup>	N/M	0.00623	0.00521
Critical Temperature	℃ °F	88.7 191.7	71.3 160.4
Critical Pressure	bara psia	55.91 810.9	49.00 710.6
Liquid Density at 25 °C <sup>1</sup>	kg/m3	1101	1059
Density of Saturated Vapor at 25°C <sup>1</sup>	kg/m3	61.47	64.87
Latent Heat of Vaporisation at boiling point <sup>3</sup>	kJ/kg	268.5	273
Heat capacity constant volume Cv (25°C & 1bara)	kJ/kg.K	0.749	0.7000
Vapor Pressure at 25°C <sup>1</sup>	bara psia	18.40 267.3	16.57 240.4
Heat capacity constant pressure Cp (25°C & 1bara)	kJ/kg.K	0.854	0.823
Cp/Cv (25°C & 1 bara)		1.141	1.1755
Vapor Viscosity (25°C & 1 bara)	сP	0.0130	0.0133
Liquid Viscosity (25°C) <sup>1</sup>	cP	0.139	0.118
Liquid Thermal Conductivity (25°C)	W/m.K	0.0846	0.0892
Specific Heat of Liquid at 25°C <sup>1</sup>	kJ/kg.K	1.58	1.71
Ozone Depletion Potential	ODP	0	0
Global Warming Potential (GWP) AR5	GWP	909	1920
Flammability Limit in Air (1 atm)	vol%	None	None
Inhalation Exposure (8 hr Day & 40 hi Week)	ppm	1000	1000

1. Bubble Point

- 2. RS-53 refrigerant properties obtained from NIST's REFPROP v10 program.
- 3. Difference between bubble point liquid enthalpy and dew point vapor enthalpy at 1 atm.

For more information visit: www.lowgwpref.com / www.replacementforr22.com / service@comstarproducts.com 1-800-328-0142 / www.comstarproducts.com / ComStar International Inc. New York, USA



## RS-53 (470A) PHYSICAL PROPERTIES AND RETROFIT PROCEDURE

### TYPE AND DESCRIPTION

RS-53 is a non-flammable, non-toxic, zero ODP blend which is a low GWP replacement for R-410A. RS-53 is a blend of R125, CO2, R32, R227ea, R134A, R1234ze.

#### Applications

RS-53 is a non-flammable, non-toxic, zero ODP blend which is a low GWP replacement for R-410A. RS-53 can also be used in new equipment and has the major advantage of being non-flammable.

#### SERVICE WORK

Because it is a blend, it is essential that RS-53 be charged into systems in the *liquid* as opposed to the gaseous phase. Since there is no need to change the existing lubricant, RS-53 is straightforward to use as the procedure below outlines.

### LUBRICANTS

RS-53 is fully compatible with polyol ester (POE) which are commonly used with R-410A.

### MATERIALS COMPATIBILITY

RS-53 is compatible with all materials commonly used in systems that were designed and charged with R-410A.

#### ENVIRONMENTAL DATA

None of the components of RS-53 contains chlorine so that it has no ability to deplete the ozone layer. RS-53 does have a direct global warming potential (GWP), but this is less than on half of the R-410A it replaces.



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## **RETROFIT PROCEDURE**

The retrofit procedure for replacing R-410A with RS-53 is as follows:

1. Ensure the right equipment is available (e.g., recovery unit and cylinders, containers for recovered lubricant, vacuum pump, weighing scales, replacement drier, etc.)

2. Record baseline data to establish the normal operating conditions for the equipment.

3. Check the manufacturer's specifications for the unit to find the recommended R-410A charge in order to determine the amount of RS-53 to add

4. Replace the filter/drier.

5. Having evacuated the system, initially *liquid charge* the unit with RS-53 up to 90% of the original charge amount of R-410A and then compare to baseline data.

6. Switch on the unit and compare the baseline data, monitor sight glasses, suction line pressure and temperature, and discharge temperature; add additional RS-53 up to the recommended R-410A system charge amount as needed.

7. Where a thermostatic expansion valve (TXV) is present and for optimum performance, make adjustments to attain the sweet spot. This is not necessary for residential systems.

8. Check system thoroughly for leaks.

9. Clearly label the system to show it contains RS-53. You're complete!