



RS-53

DESCRIPTION	
Type	HFC blend
HFC replacement	R410A
Drop-in or long term	Both
Lubricant	POE
ODP	Zero
GWP 100 year ITH	909
500 year ITH	306

RS-53: PHYSICAL PROPERTIES

		RS-53 ₍₂₎	R410A ₍₂₎
Molecular Mass		84.43	72.6
Boiling point (1 atm) (1)	⁰ C	-62.5	-51.4
	⁰ F	-80.4	-60.5
Critical Temperature	⁰ C	88.7	71.3
	⁰ F	191.7	160.4
Critical Pressure	bara	55.91	49.00
	psia	810.9	710.6
Liquid Density (25 ⁰ C) (1)	kg/m ³	1088	1059
Density of saturated vapour (25 ⁰ C) (1)	kg/m ³	61.99	64.87
Latent Heat of Vaporisation at boiling point (3)	kJ/kg	267.3	273
Heat capacity constant volume Cv (25 ⁰ C & 1bara)	kJ/kg.K	0.749	0.7000
Heat capacity constant pressure Cp (25 ⁰ C & 1bara)	kJ/kg.K	0.854	0.823
Cp/Cv (25 ⁰ C & 1 bara)		1.141	1.1755
Vapour Pressure (25 ⁰ C) (1)	bara	18.40	16.57
	psia	266.9	240.4
Vapour Viscosity (25 ⁰ C & 1 bara)	cP	0.0130	0.0133
Liquid Viscosity (25 ⁰ C) (1)	cP	0.135	0.118
Liquid Thermal Conductivity (25 ⁰ C)	W/m.K	0.0828	0.0892
Surface Tension (25 ⁰ C) (1)	N/m	0.00592	0.00521
Specific heat of liquid (25 ⁰ C) (1)	kJ/kg.K	1.59	1.71
Ozone Depletion Potential	ODP	0	0
Global warming potential AR5	GWP	909	1924
Flammability limit in air (1 atm)	vol%	none	none
Inhalation exposure (8 hour day & 40 hour week)	ppm	1000	1000

RSL
Refrigerant Solutions Limited

- (1) Bubble point
- (2) RS-51 refrigerant properties obtained from NIST's REFPROP v10 program.
- (3) Difference between bubble point liquid enthalpy and dew point vapour enthalpy at 1 atm.

TYPE AND DESCRIPTION

RS-53 is a non-flammable, non-toxic, zero ODP blend which is a low GWP replacement for R410A. RS-53 is a blend of R125, CO₂, R32, R227ea, R134a, R1234ze.

APPLICATIONS

RS-53 is the only retrofit option for R410A with a GWP less than one half that of R410A. 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 R410A.

MATERIALS COMPATIBILITY

RS-53 is compatible with all materials commonly used in systems that were designed and charged with R410A.

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 one half of the R401A it replaces.

RETROFIT PROCEDURE

The retrofit procedure for replacing R410A with RS-53 is as follows:

- (1) Ensure the right equipment is available, eg recovery unit and cylinders, container for recovered lubricant, vacuum pump, weighing scales, replacement drier etc.
- (2) Record baseline data to establish the normal operating conditions for the equipment.
- (3) Weigh recovered amount of R410A to determine amount of RS-53 to add. (See 5 below.)
- (4) Replace the filter/drier.
- (5) Having evacuated the system, initially *liquid charge* the unit with approximately 10% less RS-53 than the weight of R410A specified by the manufacturer.
- (6) Switch on the unit and monitor any sight glasses fitted, the suction line pressure and temperature, and the discharge temperature.
- (7) Check system thoroughly for leaks.
- (8) Clearly label system RS-53.