



Star International
Worldwide marine and offshore services



RS-53 (R470A)

A direct drop-in replacement for R410A with a Global Warming Potential (GWP) less than half that of R410A

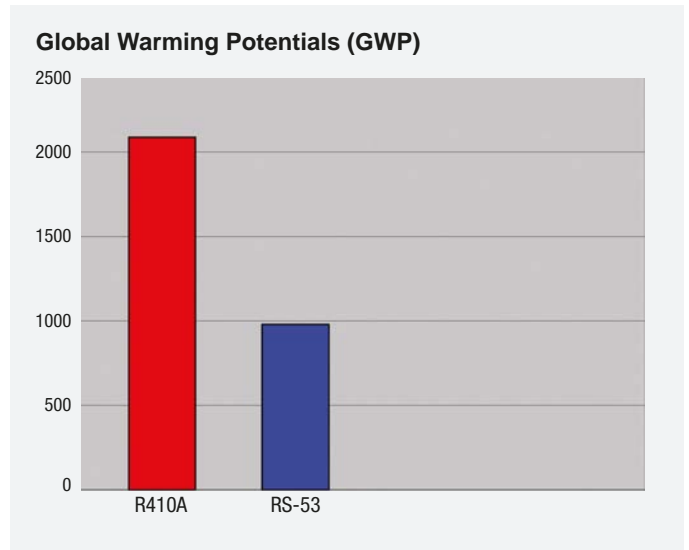


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RS-53 non-flammable low GWP drop-in replacement for R410A, and the only retrofit alternative to R410A on the market with A1 safety classification.

RS-53 delivers key benefits to operators, including:

- Full Gas compliance until 2030
- ASHRAE A1 and Standard 34 approved (non-flammable and low toxicity)
- A Global Warming Potential (GWP) of 909 – less than half that of R410A
- Similar energy efficiency to R410A
- Close match for R410A in cooling capacity
- Similar discharge pressure to R410A
- No changes to hardware required during retrofitting
- Compatible with lubricants commonly used with R410A
- Replaces R410A in air conditioning and refrigeration applications
- Similar flow rate to R410A
- Zero Ozone Depletion Potential



Easy and low-cost retrofitting

RS-53 (R470A) has comparable thermodynamic performance, energy efficiency and cooling capacity to R410A, and is compatible with materials and lubricants typically used in R410A equipment, making retrofitting easy and low-cost.

It is also non-flammable, which sets it apart from other alternatives such as R32 - a flammable solution for those seeking a replacement for hydrofluorocarbons.

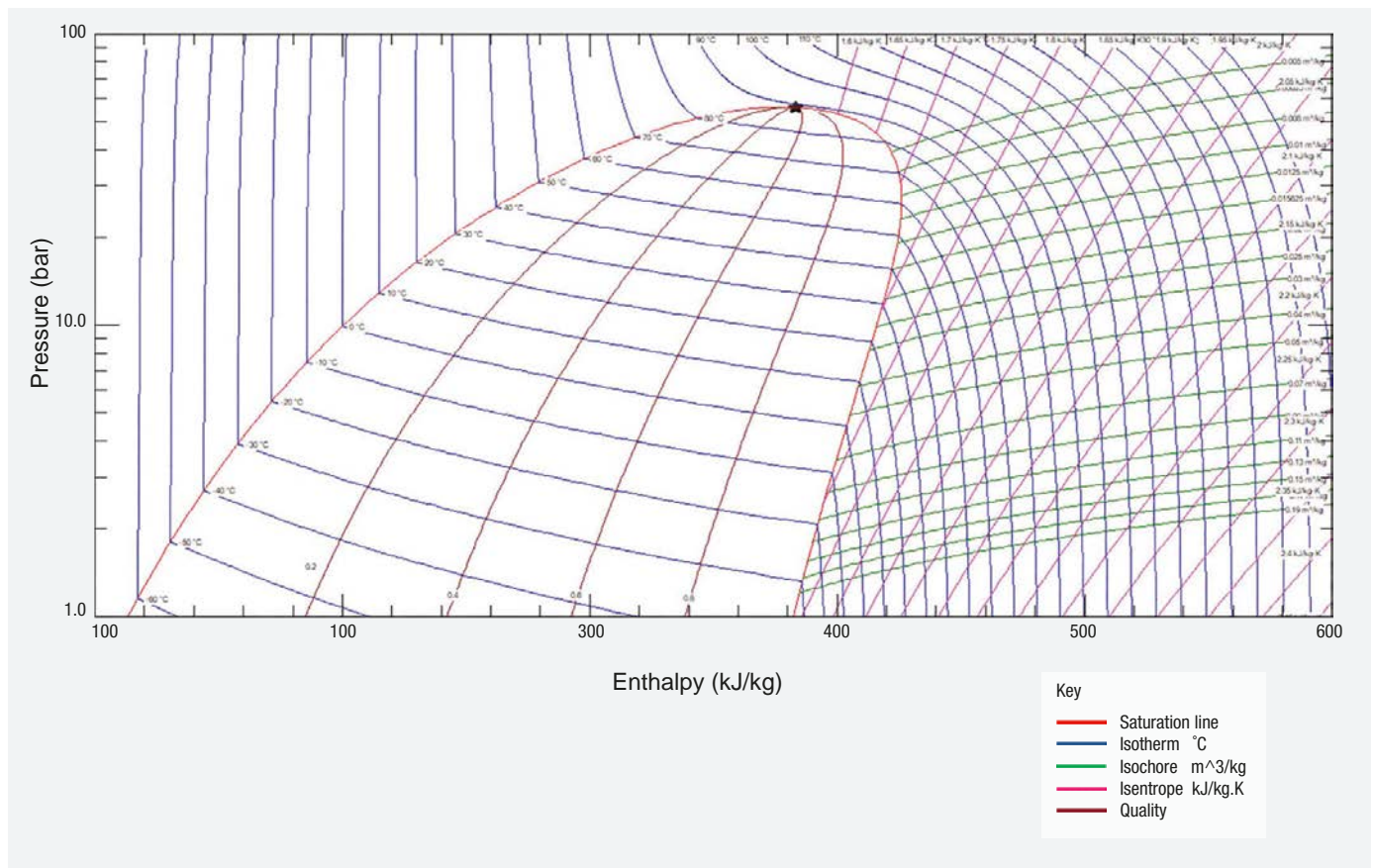
Servicing

Because RS-53 (R470A) is a blend, it should be charged into the system in the liquid as opposed to vapour form. There is no need to make any hardware changes when converting from R410A to RS-53 (R470A) which can be used with expansion devices having a fixed orifice or adjustable setting.

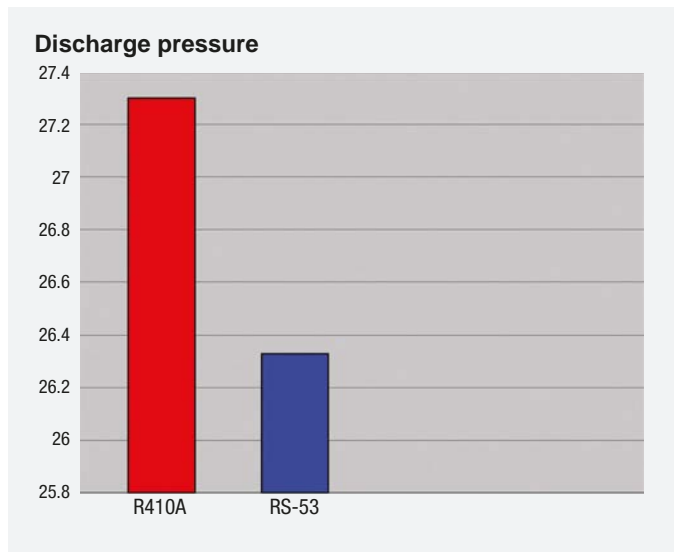
Future-proof RS Series refrigerants

The phase-out of high GWP gases in coming years is going to pose numerous risks to operators. Prices for legacy gases are on the rise and availability is also going to drop significantly as the phase out progresses. Risks to the environment from high GWP and ODP gases, as well as risks to safety posed by flammable and toxic refrigerants must also be considered. By choosing RS Series gases, operators can avoid these issues, whilst futureproofing refrigeration and air conditioning systems for the next decade.

RS-53 (R470A) pressure-enthalpy chart



Refrigeration RS-53



RS Series refrigerant distribution network

Star International, in partnership with Refrigerant Solutions Ltd has established a global distribution network for the RS Series of refrigerants. We can deliver to ports worldwide, providing a reliable and timely service to marine operators.



RS-53 (R410A) physical properties

Property		RS-50	R410A
Molecular Mass		84.43	72.6
Boiling point (1 atm)	°C	-62.7	-51.4
	°F	-80.8	-60.5
Critical temperature	°C	88.7	71.3
	°F	191.7	160.4
Critical pressure	bara	55.91	49.00
	psia	810.8	710.6
Liquid density (25°C) (1)	kg/m ³	1101	1059
Density of saturated vapour (25°C) (1)	kg/m ³	61.47	64.87
Latent heat of vaporisation at boiling point (3)	kJ/kg	268.5	273
Heat capacity constant volume Cv (25°C & 1bara)	kJ/kg.K	0.749	0.7000
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
Vapour pressure (25°C) (1)	bara	18.43	16.57
	psia	267.3	240.4
Vapour viscosity (25°C & 1 bara)	cP	0.0130	0.0133
Liquid viscosity (25°C) (1)	cP	0.139	0.118
Liquid thermal conductivity (25°C)	W/m.K	0.0846	0.0892
Surface tension (25°C) (1)	N/m	0.00623	0.00521
Specific heat of liquid (25°C) (1)	kJ/kg.K	1.58	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

(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 vapour enthalpy at 1 atm.



Key products and services:

- Marine chemicals
- Refrigeration and air conditioning
- Firefighting equipment and services
- Marine safety equipment
- LSA liferaft service and repair
- EndoSan wide-spectrum disinfectant
- Marine fuel testing and treatment
- Instrument calibration
- Marine gas detectors
- First aid and medical gases
- Jet washers
- Lorry loader and quayside services
- Narwhal Rigid Inflatable boats
- Welding equipment and services



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