



Koura  
Klea®

# Quick Guide

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# Introduction

**Building on a proud history of innovation across more than fifty years, we continue to invest in developing lower GWP refrigerant options in order to provide customers with the benefits and characteristics they need.**

The relationship we have with our customers is key to our success. Through our dedicated sales and customer service teams we are able to offer the highest standards of customer service to meet the most demanding customer needs across the world.



# Air Conditioning

A leading air conditioning  
refrigerant supplier

**Our Klea® brand is trusted by major  
manufacturers and aftermarket  
professionals the world over.**

Our success in the air conditioning industry is built on a long history of product quality, reliability and the very best levels of customer and technical support. Klea® products are approved by major equipment manufacturers and used with confidence by aftermarket professionals across the globe.



# Refrigeration

## A world leader in refrigerants

Our Klea® refrigerants are supplied to major manufacturers and a large share of the aftermarket servicing sector across commercial refrigeration, automotive and stationary air conditioning applications.



# Automotive

**Worldwide, Koura's Klea® 134a is used in over 20,000,000 new vehicles every year.**

Having established the world's first and largest commercial R-134a production plant, our continued success in the automotive sector is built on product quality, reliability and the highest levels of customer and technical support.

That's why Klea 134a is trusted by many of the leading industry names, as well as a large share of the aftermarket servicing sector around the world.



# R-134a Refrigerant

## Klea® 134a



R-134a refrigerant is widely accepted as the most appropriate alternative for R-12 over the majority of the application range for both retrofit and new equipment. A very good match to R-12 for air conditioning, high and medium temperature usage. It can be used in hybrid cascade systems for supermarkets and is being used in some of the HFO blends in order to bring lower flammability and better efficiency.

## R-134a Refrigerant Physical Properties

### Klea® 134a

Property	S.I. Units	Value	British Units	Value
Molecular Weight	kg/kmol	102.03	lbm/lbmol	102.03
Critical Temperature	°C	101.06	°F	213.91
Critical Pressure	bara	40.59	psia	588.75
Critical Density	kg/m <sup>3</sup>	511.90	lb/ft <sup>3</sup>	31.96
Normal Boiling Point	°C	-26.074	°F	-14.933
Latent Heat of Vapourisation at Atmospheric Pressure	kJ/kg	216.97	BTU <sub>IT</sub> /lb	93.28
Saturated Vapour Density at Atmospheric Pressure	kg/m <sup>3</sup>	5.2581	lb/ft <sup>3</sup>	0.33
Liquid Vapour Pressure at 25°C	bara	6.6538	psia	96.51
Coefficient of Volumetric Thermal Expansion for Saturated Liquid at 25°C	°C <sup>-1</sup>	0.0032364	°F <sup>-1</sup>	0.00180
Speed of Sound* for Saturated Vapour at 25°C	m/s	144.26	ft/s	473.29
Adiabatic Exponent* for Saturated Vapour at 25°C		1.23		1.23
Latent Heat of Vapourisation at 25°C	kJ/kg	177.780	BTU <sub>IT</sub> /lb	76.43
Saturated Vapour Density at 25°C	kg/m <sup>3</sup>	32.350	lb/ft <sup>3</sup>	2.020
Saturated Vapour Density at 0°C	kg/m <sup>3</sup>	14.428	lb/ft <sup>3</sup>	0.901

\* Vapour composition as per bulk refrigerant at dew point

# R-32 Refrigerant

## Klea® 32



R-32 refrigerant is of interest as both a blend component for alternatives to R-22 and R-502 such as Klea® 407A and Klea® 410A, and as an attractive low GWP candidate for air conditioning. It can be blended with HFOs to improve performance.

## R-32 Refrigerant Physical Properties Klea® 32

Property	S.I. Units	Value	British Units	Value
Molecular Weight	kg/kmol	52.02	lbm/lbmol	52.02
Critical Temperature	°C	78.11	°F	172.59
Critical Pressure	bara	57.82	psia	838.61
Critical Density	kg/m <sup>3</sup>	424.00	lb/ft <sup>3</sup>	26.47
Normal Boiling Point	°C	-51.651	°F	-60.972
Latent Heat of Vapourisation at Atmospheric Pressure	kJ/kg	381.86	BTU <sub>IT</sub> /lb	164.17
Saturated Vapour Density at Atmospheric Pressure	kg/m <sup>3</sup>	2.9879	lb/ft <sup>3</sup>	0.19
Liquid Vapour Pressure at 25°C	bara	16.896	psia	245.06
Coefficient of Volumetric Thermal Expansion for Saturated Liquid at 25°C	°C <sup>-1</sup>	0.00465	°F <sup>-1</sup>	0.00258
Speed of Sound* for Saturated Vapour at 25°C	m/s	203.72	ft/s	668.37
Adiabatic Exponent* for Saturated Vapour at 25°C		1.68		1.68
Latent Heat of Vapourisation at 25°C	kJ/kg	270.910	BTU <sub>IT</sub> /lb	116.47
Saturated Vapour Density at 25°C	kg/m <sup>3</sup>	47.339	lb/ft <sup>3</sup>	2.955
Saturated Vapour Density at 0°C	kg/m <sup>3</sup>	22.091	lb/ft <sup>3</sup>	1.379

\* Vapour composition as per bulk refrigerant at dew point



# R-407A Refrigerant

## Klea® 407A



R-407A refrigerant is an energy efficient, low GWP refrigerant designed for use in medium and low temperature supermarket applications. It is suitable for new installations and retrofits on existing R-22, R-507 and R-404A units. Klea® 407A meets the GWP requirements beyond 2030 under the EU F-Gas Regulations for industrial and commercial refrigeration.

## R-407A Refrigerant Physical Properties

### Klea® 407A

Property	S.I. Units	Value	British Units	Value
Molecular Weight	kg/kmol	90.11	lbm/lbmol	90.11
Critical Temperature	°C	82.26	°F	180.06
Critical Pressure	bara	45.15	psia	654.87
Critical Density	kg/m³	498.86	lb/ft³	31.14
Atmospheric Bubble Point	°C	-45.007	°F	-49.0
Atmospheric Dew Point	°C	-38.593	°F	-37.5
Latent Heat of Vapourisation at Atmospheric Pressure	kJ/kg	238.36	BTU <sub>IT</sub> /lb	102.48
Saturated Vapour Density at Atmospheric Pressure	kg/m³	4.8824	lb/ft³	0.30
Liquid Vapour Pressure at 25°C	bara	12.531	psia	181.7
Coefficient of Volumetric Thermal Expansion for Saturated Liquid at 25°C	°C <sup>-1</sup>	0.0042611	°F <sup>-1</sup>	0.00237
Speed of Sound* for Saturated Vapour at 25°C	m/s	149.33	ft/s	489.93
Adiabatic Exponent* for Saturated Vapour at 25°C		1.34		1.34
Latent Heat of Vapourisation at 25°C	kJ/kg	172.17	BTU <sub>IT</sub> /lb	74.02
Saturated Vapour Density at 25°C	kg/m³	49.749	lb/ft³	3.11
Saturated Vapour Density at 0°C	kg/m³	22.441	lb/ft³	1.40

\* Vapour composition as per bulk refrigerant at dew point

# R-407C Refrigerant

## Klea® 407C



All of the R-407 series refrigerants are based on blends of the three HFC refrigerants R-32, R-125 and R-134a. R-407C refrigerant has been formulated as a good match to the existing HCFC refrigerant R-22 for use in air conditioning, chilling and refrigeration applications and was the first of the R-22 alternatives to be used on a commercial scale. Suitable for retrofit and original equipment usage. Klea® 407C meets the GWP requirements beyond 2030 under the EU F-Gas Regulations for industrial and commercial refrigeration. Composition (wt%) R-32/R-125/R-134a = 23/25/52. Please note that not all products are available in all markets.

## R-407C Refrigerant Physical Properties

### Klea® 407C

Property	S.I. Units	Value	British Units	Value
Molecular Weight	kg/kmol	86.20	lbm/lbmol	86.20
Critical Temperature	°C	86.03	°F	186.85
Critical Pressure	bara	46.29	psia	671.42
Critical Density	kg/m <sup>3</sup>	484.20	lb/ft <sup>3</sup>	30.23
Atmospheric Bubble Point	°C	-43.627	°F	-46.5
Atmospheric Dew Point	°C	-36.629	°F	-33.9
Latent Heat of Vapourisation at Atmospheric Pressure	kJ/kg	256.29	BTU <sub>IT</sub> /lb	110.18
Saturated Vapour Density at Atmospheric Pressure	kg/m <sup>3</sup>	4.6306	lb/ft <sup>3</sup>	0.29
Liquid Vapour Pressure at 25°C	bara	11.903	psia	172.6
Coefficient of Volumetric Thermal Expansion for Saturated Liquid at 25°C	°C <sup>-1</sup>	0.0040236	°F <sup>-1</sup>	0.00224
Speed of Sound* for Saturated Vapour at 25°C	m/s	154.97	ft/s	508.43
Adiabatic Exponent* for Saturated Vapour at 25°C		1.33		1.33
Latent Heat of Vapourisation at 25°C	kJ/kg	188.42	BTU <sub>IT</sub> /lb	81.01
Saturated Vapour Density at 25°C	kg/m <sup>3</sup>	43.77	lb/ft <sup>3</sup>	2.73
Saturated Vapour Density at 0°C	kg/m <sup>3</sup>	19.689	lb/ft <sup>3</sup>	1.23

\* Vapour composition as per bulk refrigerant at dew point

# R-407H Refrigerant

## Klea® 407H



With increasing regulation on HFCs, there is greater demand for refrigerants that are safe, energy efficient, allow for easy economical conversion and comply with various global regulations. In addressing this demand, Koura has launched Klea® 407H. With its ease of retrofit and performance. Klea® 407H is a cost effective, “drop in” solution for many refrigerant systems. Our considered solution has been designed specifically for an efficient future.

### R-407H Refrigerant Physical Properties

#### Klea® 407H

Chemical Name		Difluoromethane/ Pentafluoroethane/ 1,1,1 Tetrafluoroethane
Chemical Formula		CH2F2/CHF2-CF3/CF3-CH2F
GWP100	IPCC 4th AR/5th AR	1495/1380
Molecular Weight	bara	46.29
Boiling Point @ 1.013 bar bubble point / dew point	°C	-44.7/-37.6
Critical Temperature	°C	86.5
Critical Pressure	bar	48.5
Critical Density	kg/m3	464.1
Critical Volume	dm3/kg	2.155
Liquid Density3	kg/m3	111.2
Vapour Density3	kg/m3	41.86
Heat of Vaporization3	kJ/kg	199.02
cp liq.3	kJ/(kg K)	1.585
cp vap.3	kJ/(kg K)	1.176
Temp. Glide @ NBP	K	7.0
ASHRAE 34 safety class		A1

2 All thermo-physical data are based on Refprop 9.0  
3sat. @25°C

# R-410A Refrigerant

## Klea® 410A



R-410A refrigerant is a leading high pressure alternative to R-22, comprising R-32 and R-125, for air conditioning and refrigerant applications for new equipment. Composition (wt%) R-32/R-125 = 50/50. Please note that not all products are available in all markets.

## R-410A Refrigerant Physical Properties

### Klea® 410A

Property	S.I. Units	Value	British Units	Value
Molecular Weight	kg/kmol	72.59	lbm/lbmol	72.59
Critical Temperature	°C	71.35	°F	160.43
Critical Pressure	bara	49.02	psia	710.96
Critical Density	kg/m <sup>3</sup>	459.53	lb/ft <sup>3</sup>	28.69
Atmospheric Bubble Point	°C	-51.443	°F	-60.6
Atmospheric Dew Point	°C	-51.364	°F	-60.5
Latent Heat of Vapourisation at Atmospheric Pressure	kJ/kg	279.12	BTU <sub>IT</sub> /lb	120.00
Saturated Vapour Density at Atmospheric Pressure	kg/m <sup>3</sup>	4.1742	lb/ft <sup>3</sup>	0.26
Liquid Vapour Pressure at 25°C	bara	16.574	psia	240.4
Coefficient of Volumetric Thermal Expansion for Saturated Liquid at 25°C	°C <sup>-1</sup>	0.0051708	°F <sup>-1</sup>	0.00287
Speed of Sound* for Saturated Vapour at 25°C	m/s	161.86	ft/s	531.04
Adiabatic Exponent* for Saturated Vapour at 25°C		1.58		1.58
Latent Heat of Vapourisation at 25°C	kJ/kg	190.6	BTU <sub>IT</sub> /lb	81.94
Saturated Vapour Density at 25°C	kg/m <sup>3</sup>	65.972	lb/ft <sup>3</sup>	4.12
Saturated Vapour Density at 0°C	kg/m <sup>3</sup>	30.576	lb/ft <sup>3</sup>	1.91

\* Vapour composition as per bulk refrigerant at dew point

# R-125 Refrigerant

## Klea® 125



R-125 refrigerant is a main building block for blended refrigerants used as replacements for R-502 and R-22. These blends include Klea® 410A which has become a leading replacement for R-22, Klea® 407C which was one of the first commercially available blends suitable for both retrofit and original equipment use of R-22 systems and Klea® 407A, a lower GWP alternative to Klea® 404A and Klea® 507. Please note that not all products are available in all markets.

## R-125 Refrigerant Physical Properties

### Klea® 125

Property	S.I. Units	Value	British Units	Value
Molecular Weight	kg/kmol	120.02	lbm/lbmol	120.02
Critical Temperature	°C	66.02	°F	150.84
Critical Pressure	bara	36.18	psia	524.70
Critical Density	kg/m <sup>3</sup>	573.58	lb/ft <sup>3</sup>	35.81
Normal Boiling Point	°C	-48.089	°F	-54.560
Latent Heat of Vapourisation at Atmospheric Pressure	kJ/kg	164.1	BTU <sub>IT</sub> /lb	70.55
Saturated Vapour Density at Atmospheric Pressure	kg/m <sup>3</sup>	6.79	lb/ft <sup>3</sup>	0.42
Liquid Vapour Pressure at 25°C	bara	13.779	psia	199.85
Coefficient of Volumetric Thermal Expansion for Saturated Liquid at 25°C	°C <sup>-1</sup>	0.0055069	°F <sup>-1</sup>	0.00306
Speed of Sound* for Saturated Vapour at 25°C	m/s	117.32	ft/s	384.91
Adiabatic Exponent* for Saturated Vapour at 25°C		1.36		1.36
Latent Heat of Vapourisation at 25°C	kJ/kg	110.390	BTU <sub>IT</sub> /lb	47.46
Saturated Vapour Density at 25°C	kg/m <sup>3</sup>	90.557	lb/ft <sup>3</sup>	5.653
Saturated Vapour Density at 0°C	kg/m <sup>3</sup>	42.070	lb/ft <sup>3</sup>	2.626

\* Vapour composition as per bulk refrigerant at dew point

# R-404A Refrigerant

## Klea® 404A



R-404A refrigerant is an established alternative to R-22 and R-502. Please note that for reduced GWP, Klea® 407A offers a good alternative. Composition (wt%) R-143a/R-125/R-134a = 52/44/4. Please note that not all products are available in all markets.

## R-404A Refrigerant Physical Properties

### Klea® 404A

Property	S.I. Units	Value	British Units	Value
Molecular Weight	kg/kmol	97.60	lbm/lbmol	97.60
Critical Temperature	°C	72.05	°F	161.68
Critical Pressure	bara	37.29	psia	540.83
Critical Density	kg/m³	486.54	lb/ft³	30.37
Atmospheric Bubble Point	°C	-46.2	°F	-51.2
Atmospheric Dew Point	°C	-45.5	°F	-49.8
Latent Heat of Vapourisation at Atmospheric Pressure	kJ/kg	199.61	BTU <sub>IT</sub> /lb	85.82
Saturated Vapour Density at Atmospheric Pressure	kg/m³	5.48	lb/ft³	0.34
Liquid Vapour Pressure at 25°C	bara	12.5	psia	182.0
Coefficient of Volumetric Thermal Expansion for Saturated Liquid at 25°C	°C <sup>-1</sup>	0.00495	°F <sup>-1</sup>	0.00275
Speed of Sound* for Saturated Vapour at 25°C	m/s	133.8	ft/s	438.94
Adiabatic Exponent* for Saturated Vapour at 25°C		1.37		1.37
Latent Heat of Vapourisation at 25°C	kJ/kg	138.99	BTU <sub>IT</sub> /lb	59.75
Saturated Vapour Density at 25°C	kg/m³	65.27	lb/ft³	4.07
Saturated Vapour Density at 0°C	kg/m³	30.47	lb/ft³	1.90

\* Vapour composition as per bulk refrigerant at dew point

# R-448A Refrigerant

## Klea® 448A



R-448A refrigerant is an excellent low-GWP, highly energy efficient and non-flammable refrigerant for low and medium temperature in commercial refrigeration: supermarket systems, vending machines (plug-ins) and other applications. Composition (wt%) R-32/R-125/R-134a = 20/40/40. Please note that not all products are available in all markets.

## R-448A Refrigerant Physical Properties

### Klea® 448A

Property	S.I. Units	Value
Chemical Notation		26% R-32 / 26% R-125 / 21% R-134a / 7% R-1234ze / 20% R-1234yf
Critical Temperature	°C	83.7
Critical Pressure	bar	46.6
Liquid Density 0°C	kg/m <sup>3</sup>	1192.5
ANSIASHRAE Standard 36-1992 Safety Group Classification		A1
Relative Molar Mass	kg/mol	189.9
Vapour Density 25°C	kg/m <sup>3</sup>	1.553
GWP		1273
ODP		Non-ozone depleting
REACH		Registered
ATEL/ODL (kg/m <sup>3</sup> )	kg/m <sup>3</sup>	0.39
Practical Limit (kg/m <sup>3</sup> )	kg/m <sup>3</sup>	0.39
Low Flammability Level		Non-flammable

\* Vapour composition as per bulk refrigerant at dew point

# R-507 Refrigerant

## Klea® 507



R-507 refrigerant is a viable alternative to R-22 and R-502 for new and retrofit applications, Klea® 507 offers good benefits in flooded systems. For a reduced GWP alternative, Klea® 407A is a good refrigerant in supermarket and other commercial applications. Composition (wt%) R-125/R-143a = 50/50. Please note that not all products are available in all markets.

## R-507 Refrigerant Physical Properties

### Klea® 507

Property	S.I. Units	Value	British Units	Value
Molecular Weight	kg/kmol	98.86	lbm/lbmol	98.86
Critical Temperature	°C	70.62	°F	159.11
Critical Pressure	bara	37.05	psia	537.36
Critical Density	kg/m³	490.77	lb/ft³	30.64
Atmospheric Bubble Point	°C	-46.741	°F	-52.1
Atmospheric Dew Point	°C	-46.741	°F	-52.1
Latent Heat of Vapourisation at Atmospheric Pressure	kJ/kg	196.8	BTU <sub>IT</sub> /lb	84.61
Saturated Vapour Density at Atmospheric Pressure	kg/m³	5.5861	lb/ft³	0.35
Liquid Vapour Pressure at 25°C	bara	12.826	psia	186.0
Coefficient of Volumetric Thermal Expansion for Saturated Liquid at 25°C	°C <sup>-1</sup>	0.0050859	°F <sup>-1</sup>	0.00283
Speed of Sound* for Saturated Vapour at 25°C	m/s	131.85	ft/s	432.58
Adiabatic Exponent* for Saturated Vapour at 25°C		1.38		1.38
Latent Heat of Vapourisation at 25°C	kJ/kg	135.76	BTU <sub>IT</sub> /lb	58.37
Saturated Vapour Density at 25°C	kg/m³	68.888	lb/ft³	4.30
Saturated Vapour Density at 0°C	kg/m³	32.251	lb/ft³	2.01

\* Vapour composition as per bulk refrigerant at dew point



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## Product Information

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