



**Koura**  
Klea®

**Next Generation**  
Refrigerants

# Introduction

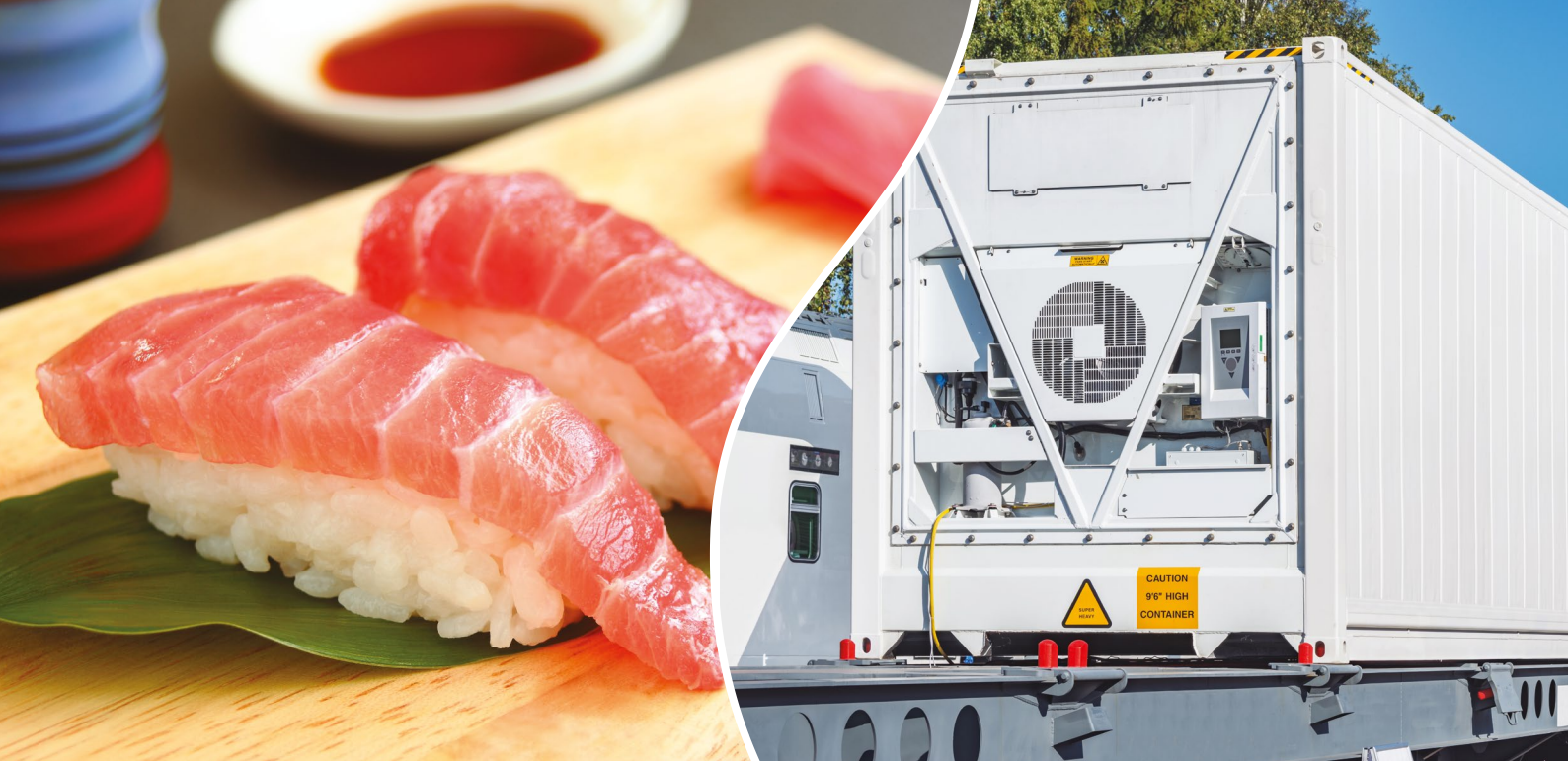
We are committed to innovation, providing customers across a variety of industries worldwide with future proof solutions. Our ongoing research and development program has been a key focus for over fifteen years, with product development part of our ongoing evolution.

Our aim is to produce innovative, more sustainable products which provide high quality performance with a lower GWP. Our offering is designed to deliver a significant improvement on current products available, benefitting the industry and the environment in the long term.

Our latest innovations include Klea® 473A and LFR3, with new product developments to come.







# Koura Klea<sup>®</sup> 473A

## Next Generation Refrigerant

Our latest innovation, Klea<sup>®</sup> 473A is designed to achieve **high performance** with a significantly **lower global warming potential** to support the ever increasing demand across the industry.

### Applications

- High value cold chain
- Medical
- Pharmaceutical
- Test Chambers

### Expected Benefits

- Lower GWP
- Excellent performance
- Non-flammable
- Security of supply

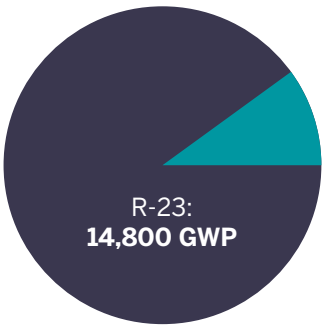
### Expected Performance

- ✓ Low glide
- ✓ Effective to at least -75 °C
- ✓ Improved cooling capacity compared to R-23
- ✓ Improved energy efficiency compared to R-23
- ✓ Charge size reduction of **up to 15%**

## Details

Lower GWP. With a GWP of ca 1,800, this represents a **90% reduction** compared to R-23.

Exceeds F-Gas regulations and future proof.

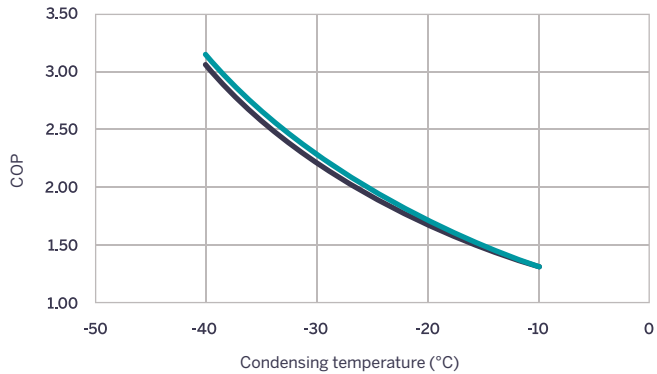


Klea® 473A:  
**1,800 GWP**

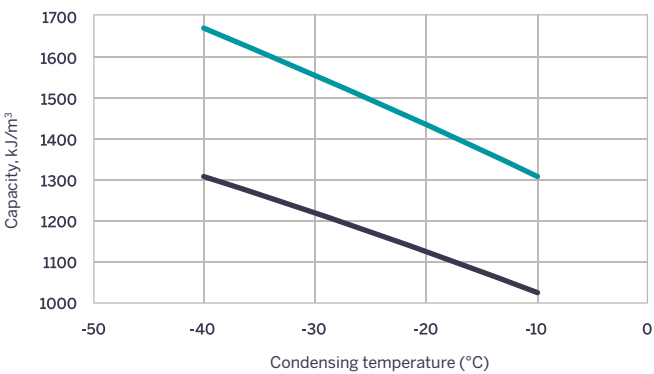
## Preliminary Performance Modelling

Key: R-23 — Klea® 473A —

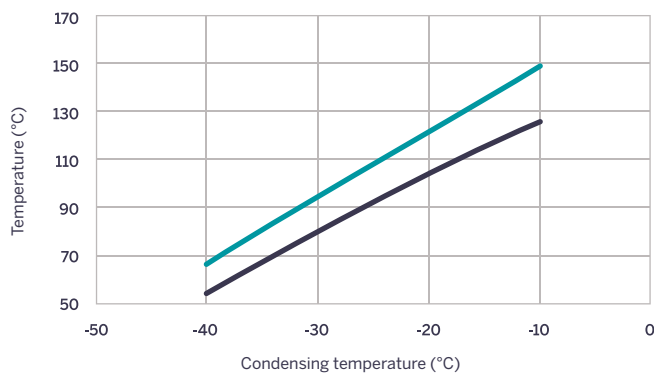
COP of R-23 and Klea® 473A  
evaporator temperature -70°C



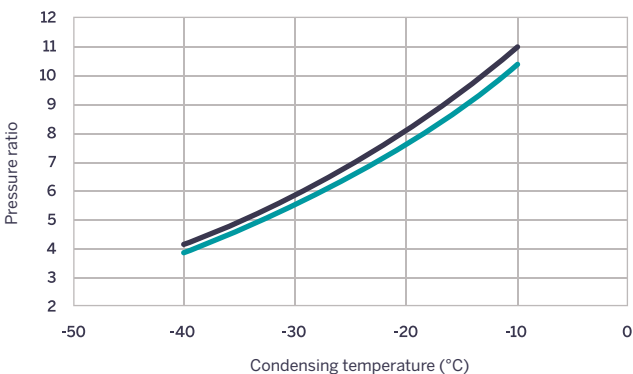
Volumetric cooling capacity of R-23 and Klea® 473A  
evaporator temperature -70°C



Compressor exit temperature of R-23 and Klea® 473A  
evaporator temperature -70°C



Compressor pressure ratio of R-23 and Klea® 473A  
evaporator temperature -70°C



### Non flammable

Anticipate A1  
ASHRAE accreditation



### Security of supply

Manufacturing available  
in UK, USA & Asia



# Koura LFR3

## Development Refrigerant

LFR 3 is designed to achieve a **lower environmental impact** and **better performance** than CO<sub>2</sub> across a range of ambient temperatures – it will be suitable for a range of cooling applications across the industry.

### Applications

- Vehicle and passenger transportation air-conditioning
- Heat pump systems
- Cold chain refrigeration and transport refrigeration
- Commercial refrigeration applications

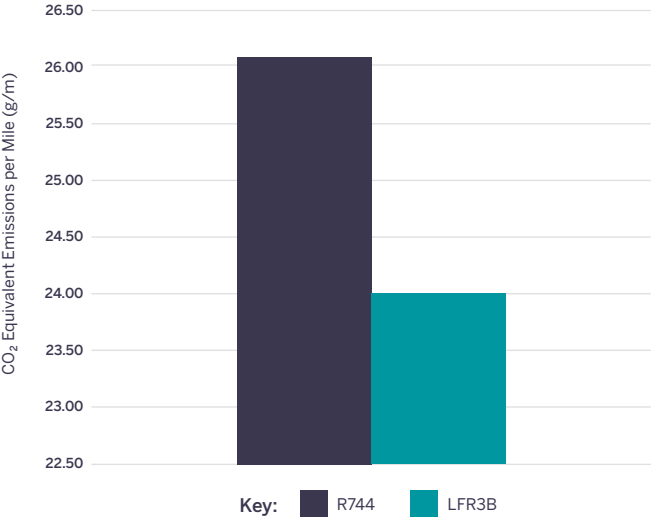
### Expected Benefits

- Designed to have lower environmental impact than CO<sub>2</sub>
- Non-flammable as formulated
- Lower operating pressure than CO<sub>2</sub>
- Low GWP (140 AR5)

### Expected Performance

- ✓ More energy efficient than CO<sub>2</sub>
- ✓ Excellent performance in residential heat pump and mobile air-conditioning systems
- ✓ Energy efficiency up to 20% higher than CO<sub>2</sub>
- ✓ Operating pressure 15 - 20% lower than CO<sub>2</sub>

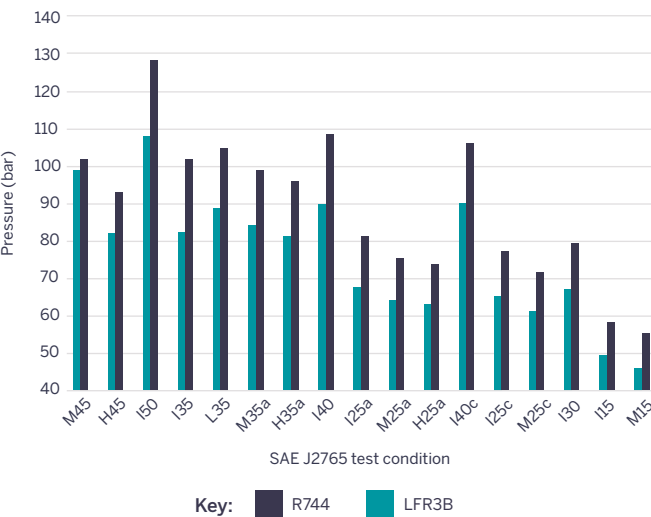
# Lower Environmental Impact than CO<sub>2</sub>\*



Weighted MAC Operation Contribution per Mile - All Green MAC Cities

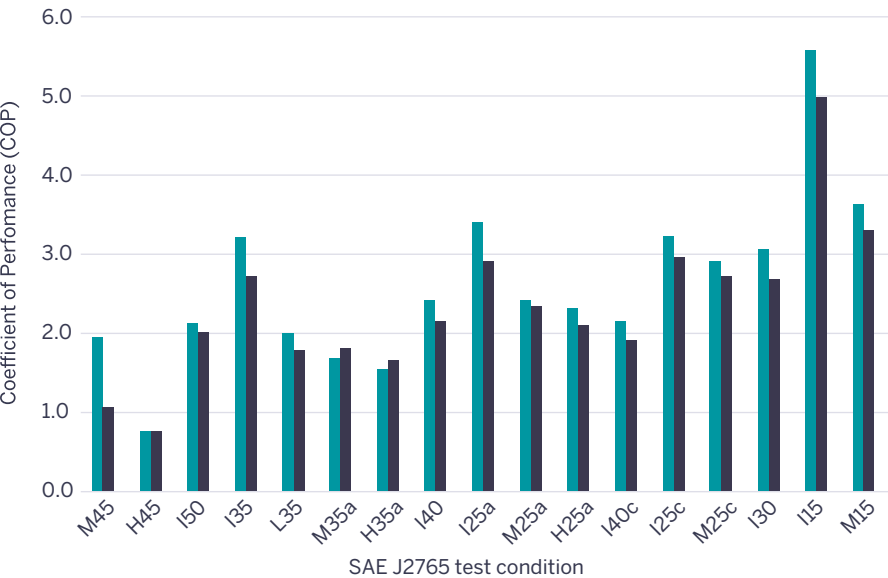
\*Lower LCCP result derived from preliminary analysis testing a production system designed for R744

# Lower Operating Pressure



Reduced operating pressure by up to 15% - therefore reduced engineering cost and architecture

# Performance



Performance is improved by up to 15% in unoptimized tests.

Further improvement possible by up to 20%



For more information visit  
**Klea.com**

**Klea®**

## Product Information

### Disclaimer

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**Contact us today to see how we can work together**

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