

Klea® 407A

Klea® 407A is an energy efficient, reduced GWP alternative for R-22 and R-404A in new and existing refrigeration systems operating at both medium and low temperatures.

Widely approved and proven in use, Klea® 407A offers an established choice to replace products affected by legislation such as the EU F-Gas Regulations and the Significant New Alternatives Policy (SNAP) in the USA.

A straightforward change from R-404A

Klea® 407A is compatible with the major system components used for R-404A including compressors, lubricants, pipework, heat exchangers and valves. The ease with which Klea® 407A can be retrofitted has been regularly demonstrated, including at a supermarket project in Spain, where a multipack plant operational with R-404A since 2008 was quickly swapped in an overnight process that allowed the store to close at its regular time and open for business as usual the next morning.

Table 1 Comparison of R-407A performance with R-404A and R-407F

-32C evap., 36C cond.	R-404A	R-407A	R-407F
Mass Flow	100%	78.4%	70.3%
Volume Flow	100%	100%	92.9%
COP	100%	106.8%	106.8%
Condenser mid-P	100%	95.4%	99.9%
Evaporator mid-P	100%	85.9%	90.8%
Pressure Ratio	100%	111%	110%
ΔT compressor discharge from R-404A	0°C	+18.2°C	+26.5°C

Table 2 Comparison of R-407A performance with R-22 and R-404A (Low Temp)

-32C evap., 36C cond.	R-22	R-404A	R-407A
Mass Flow	100%	147%	102%
Volume Flow	100%	102%	110%
COP	100%	88%	96%
Condenser mid-P	100%	119%	107%
Evaporator mid-P	100%	125%	93%
Pressure Ratio	100%	95%	115%
ΔT compressor discharge from R-22	0°C	-44°C	-21°C

Table 3 Comparison of R-407A performance with R-22 and R-404A (Med Temp)

-7C evap., 36C cond.	R-22	R-404A	R-407A
Mass Flow	100%	139%	109%
Volume Flow	100%	97%	96%
COP	100%	92%	96%
Condenser mid-P	100%	119%	114%
Evaporator mid-P	100%	122%	107%
Pressure Ratio	100%	98%	106%
ΔT compressor discharge from R-22	0°C	-24°C	-14°C

Potential cost savings

In many documented laboratory and field implementation studies, Klea® 407A offers significant potential for reduced operating costs through improved energy efficiency. Given its lower GWP it is also likely to continue to be a more cost-effective option as the relative price of R-404A rises.

The cost saving benefits of Klea® 407A have been shown across a number of projects, resulting in a significant reduction in energy consumption.

Figure 1

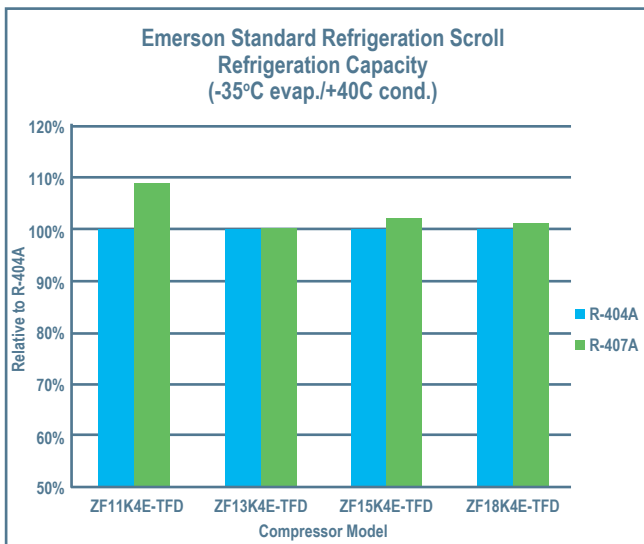
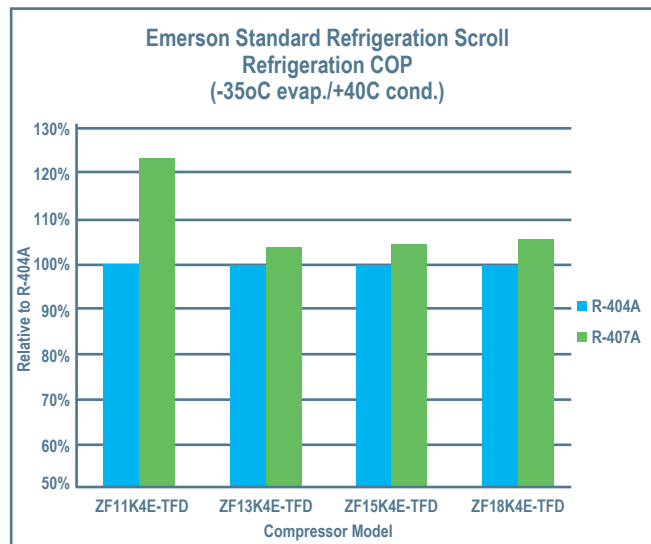


Figure 2



Klea® 407A also has a wider operating envelope than alternatives such as R-407F and generally does not require any additional auxiliary compressor cooling to be fitted, although of course this is subject to the details of the system and on the particular compressor manufacturer's advice. In contrast, the inherently higher compressor discharge temperatures of R-407F can often require a parasitic injection cooling system to be installed during the retrofit in order to protect the compressor.

Reduced Environmental Impact

Importantly, a combination of both reduced GWP and improved energy efficiency – the major contributor to carbon emissions from refrigeration – make Klea® 407A an attractive option for reduced environmental impact when compared with refrigerants such as R-404A.

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