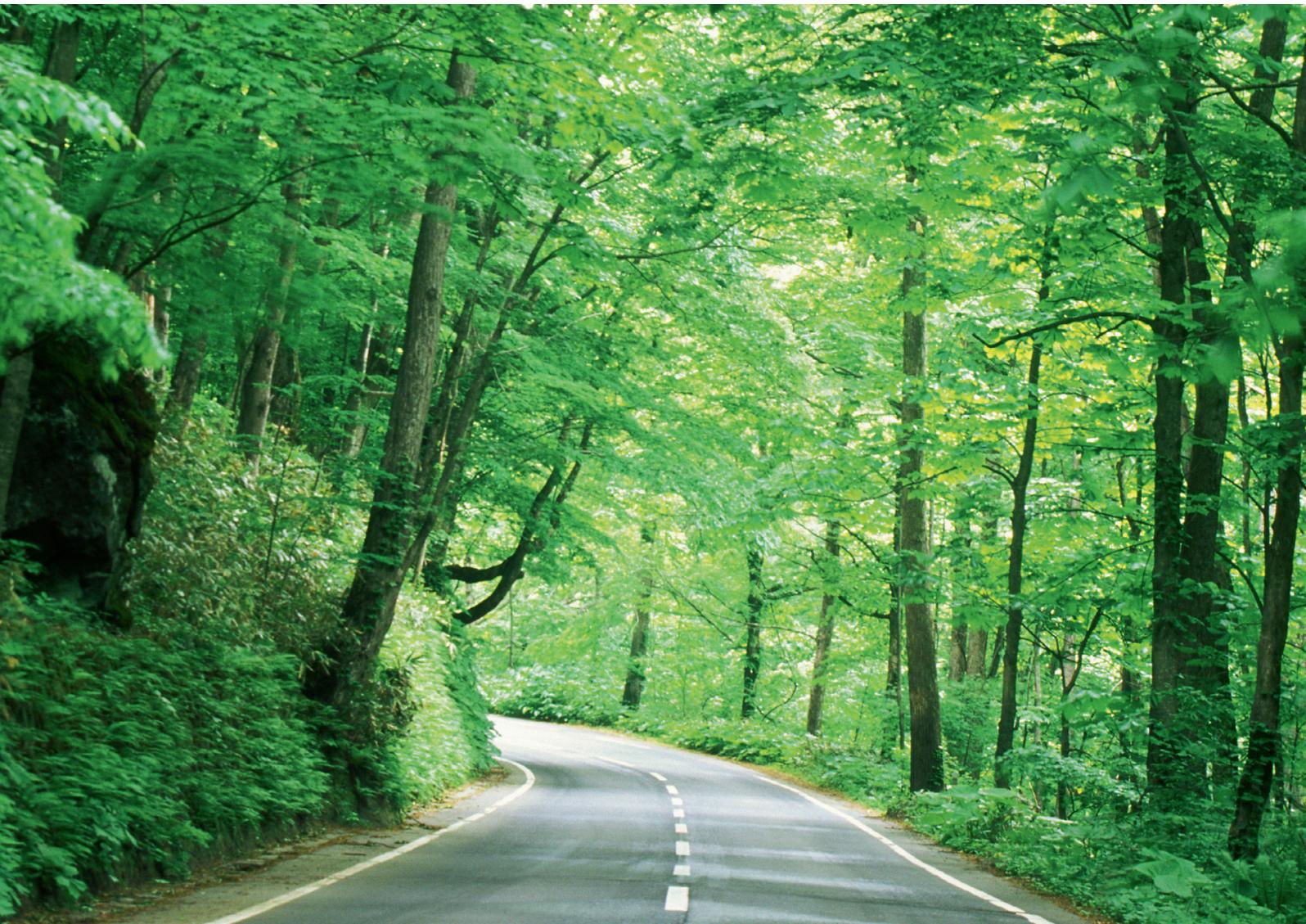


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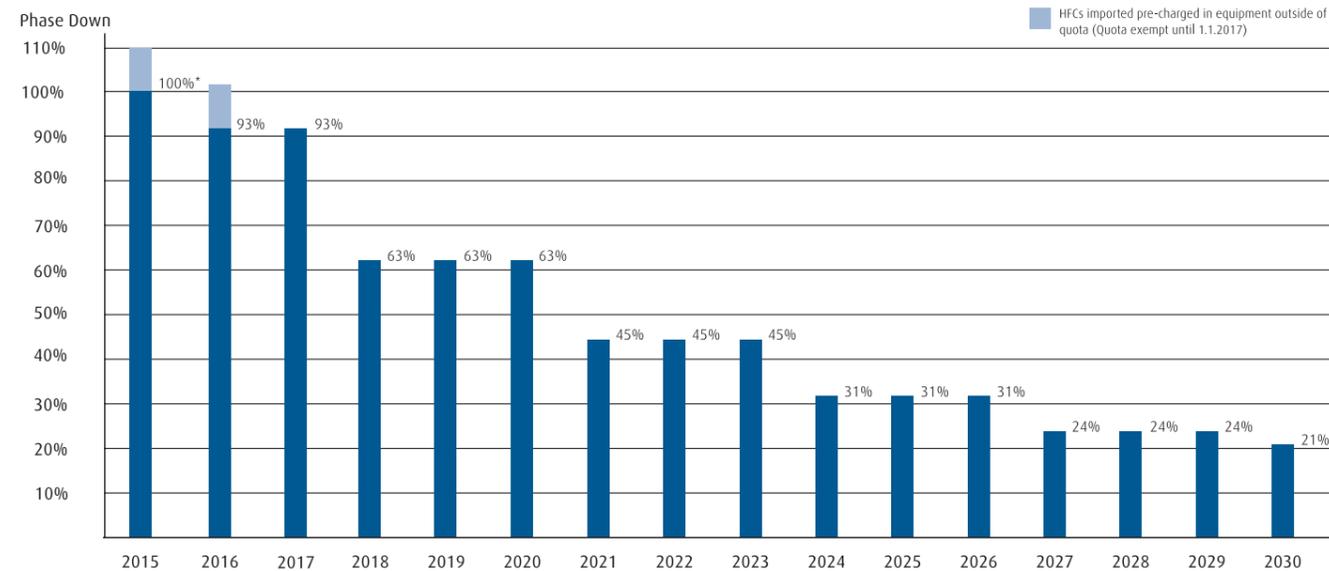
# R452A – Opteon<sup>®</sup> XP44

Lower global warming potential  
replacement for R404A and R507



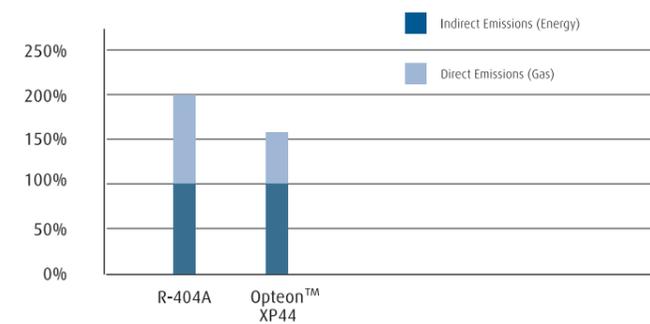
# R452A – Opteon® XP44. Lower-GWP replacement for R404A and R507 in transport refrigeration applications.

Diagram 1: HFC phase down schedule (CO<sub>2</sub>e basis, in %)



\* 100% = Average of 2009–2012

Diagram 2: TEWI (Total Equivalent Warming Impact) R-404A vs. Opteon™ XP44 (R-452A)



## The environmental challenge

For over twenty years, R404A has been an extremely useful refrigerant gas in a number of applications, including transport refrigeration applications such as refrigerated trucks. However, refrigeration systems generate both direct and indirect CO<sub>2</sub> emissions during their lifetime. Although an effective refrigerant, R404A has one of the highest global warming potentials (GWPs) of any refrigerant gas, often leading to high direct greenhouse gas emissions and therefore high CO<sub>2</sub> equivalent (CO<sub>2</sub>e) emissions over the equipment lifetime.

EU f-gas regulation 517/2014 is a reality since 2015. The way for refrigeration solutions that can provide satisfactory cooling performance with a lower global warming impact has been already paved. On the top, the ban of R404A in EU in 2020, according to f-gas regulation, demands environmentally friendly refrigeration solutions.

## The low-GWP solution

Opteon® XP44 (R452A) is a non-flammable, next-generation HFO-based refrigerant blend with a close performance match to R404A, including a similar low discharge temperature which makes it ideal for both new and retrofit transport refrigeration applications. With a significantly lower GWP, it provides a realistic solution in place of R404A.

R452A is designed for use in direct expansion, low and medium temperature commercial, industrial and transport refrigeration applications. It is suitable for new installations and the straightforward retrofit of existing systems.

	R404A	R452A – Opteon XP44
Constituents	R143a/R125/R134a	R32/R125/R1234yf
Preferred Oil	Polyester (POE)	Polyester (POE)
ASHRAE safety classification	A1 – non-toxic and non-flammable	A1 – non-toxic and non-flammable
Boiling point @ 1atm	-46.5	-47.0
Critical temperature	72.0	74.9
Critical pressure	37.3 bar(a)	40.1 bar(a)
GWP (AR4)	3922	2140
GWP (AR5)	3943	1945



## Benefits at a glance

### Lower environmental impact

- Approximately 45% reduction in GWP compared with R404A
- Zero ozone depletion potential
- Non-toxic and non-flammable

### Wide application range

- Low and medium temperature transport DX refrigeration
- Low and medium temperature industrial and commercial DX refrigeration
- New and retrofit applications

### Easy retrofit process

- Long term solution – alternative to R404A and R507A
- Compatible with the same oils, elastomers and plastics as R404A
- Supported by major equipment and component manufacturers
- Can be topped off after leaks

### Impressive performance

- Matches discharge temperature
- Matches mass flow rate of R404A/R507A

## Retrofit made easy

The changeover from R404A to Opteon XP44 is a relatively easy process. The gas is fully compatible with the POE lubricants used in an R404A system. In many cases, the original oils can be used.

XP44 (like other gases such as R407C) is azeotrope. Therefore it must be charged in the liquid phase to prevent fractionation. The refrigerant has a similar mass flow rate to R404A so, Thermostatic Expansion Valve (TXV) settings may be retained with minor adjustments. We also recommend that you overhaul your refrigeration system during the retrofit operation, including the filter drier and seals.

## Trusted partner

The Gases Division of Linde is one of the largest and most global distributors of refrigerants. For more than 40 years, we have been a trusted partner of refrigeration and air conditioning companies around the world. We operate throughout Europe, Africa, Asia-Pacific and the Americas.

Our broad product range spans both traditional fluorocarbon as well as next generation HFO and natural refrigerants. R452A is commonly available in cylinders. Other packages may be available upon request. Our high-quality operations and vast distribution networks ensure the quality and availability of our products. We also offer a range of complementary services, including technical support, legislative compliance assistance and environmental audits.

# Getting ahead through innovation.

With its innovative concepts, Linde is playing a pioneering role in the global market. As a technology leader, it is our task to constantly raise the bar. Traditionally driven by entrepreneurship, we are working steadily on new high-quality products and innovative processes.

Linde offers more. We create added value, clearly discernible competitive advantages, and greater profitability. Each concept is tailored specifically to meet our customers' requirements – offering standardised as well as customised solutions. This applies to all industries and all companies regardless of their size.

If you want to keep pace with tomorrow's competition, you need a partner by your side for whom top quality, process optimisation, and enhanced productivity are part of daily business. However, we define partnership not merely as being there for you but being with you. After all, joint activities form the core of commercial success.

Linde – Making our world more productive.

Linde is distribution partner for



**Opteon® XP44**  
REFRIGERANT

Linde Gas

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