R442A (RS-50)
Lower Global Warming Potential replacement for R404A.
R442A – RS-50
Lower-GWP replacement for R404A.

The environmental challenge

For over twenty years, R404A has been an extremely useful refrigerant gas in a number of applications, including commercial refrigeration systems such as those often used in supermarkets. However, refrigeration and air conditioning systems generate both direct and indirect CO₂ 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 CO₂ equivalent (CO₂e) emissions over the equipment lifetime.

A growing focus on the environmental impact of refrigerants is fuelling demand for refrigeration solutions that can provide satisfactory cooling performance with a lower global warming impact. This is propelling environmentally friendly refrigeration solutions to the top of the corporate sustainability agenda. In addition, local legislation is increasingly targeting refrigerant gases with a high GWP.

The low-GWP solution

Developed by Refrigerant Solutions Limited, R442A (RS-50) is the ideal retrofit solution for many existing R404A systems. This lower-GWP alternative has been shown to be more efficient than R404A in many systems, thus combining environmental gains with lower energy costs. A straightforward retrofit process adds to the appeal of this solution.

R442A can also be used as a retrofit solution for R22 and R507. Please contact your local Linde representative for more information if you wish to use for these applications.

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**GWP of some common HFC refrigerants**

<table>
<thead>
<tr>
<th>Refrigerant</th>
<th>GWP</th>
</tr>
</thead>
<tbody>
<tr>
<td>R134a</td>
<td>4,000</td>
</tr>
<tr>
<td>R407C</td>
<td>3,000</td>
</tr>
<tr>
<td>R442A</td>
<td>2,000</td>
</tr>
<tr>
<td>R410A</td>
<td>1,000</td>
</tr>
<tr>
<td>R407A</td>
<td>800</td>
</tr>
<tr>
<td>R442A</td>
<td>600</td>
</tr>
<tr>
<td>R507</td>
<td>400</td>
</tr>
</tbody>
</table>

**Total emissions in an example system**

- **Indirect emissions (energy)**
- **Direct emissions (gas)**

Reduction in direct emissions due to use of lower GWP gas

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**R442A – RS-50**

**Lower-GWP replacement for R404A.**

<table>
<thead>
<tr>
<th><strong>Constituents</strong></th>
<th><strong>R404A</strong></th>
<th><strong>R442A</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Preferred oil</td>
<td>R134a/R125/R134a</td>
<td>Polyolester (POE)</td>
</tr>
<tr>
<td>ASHRAE safety classification</td>
<td>AT – non-toxic &amp; non-flammable</td>
<td>AT – non-toxic &amp; non-flammable</td>
</tr>
<tr>
<td>Boiling point @ 1atm</td>
<td>-46.5°C</td>
<td>-46.5°C</td>
</tr>
<tr>
<td>Critical temperature</td>
<td>72.0°C</td>
<td>82.4°C</td>
</tr>
<tr>
<td>Critical pressure</td>
<td>37.3 bar(a)</td>
<td>47.6 bar(a)</td>
</tr>
<tr>
<td>GWP</td>
<td>100%</td>
<td>1888</td>
</tr>
<tr>
<td>GWP as % of R404A</td>
<td>100%</td>
<td>48%</td>
</tr>
</tbody>
</table>

*Systems will vary. Example assuming R404A system with equal direct and indirect emissions is retrofitted to operate on R442A. Energy use and refrigerant leakage assumed the same in both cases.*
R442A (RS-50). Lower Global Warming Potential replacement for R404A. Lower environmental impact

→ Greater than 50% reduction in GWP compared with R404A
→ Zero ozone depletion potential
→ Non-toxic and non-flammable

Easy retrofit process

→ Compatible with the same oils, elastomers and plastics as R404A
→ New product with a number of successful retrofit references

Impressive performance

→ Significantly higher cooling capacity than R404A
→ Energy efficiency savings of up to 40% compared to R404A
→ Higher cooling capacity & COP than other R404A alternatives

Benefits at a glance

R442A (like other gases such as R407C) is a zeotrope. Therefore it must be charged in the liquid phase to prevent fractionation. R442A does have a moderate glide, although this can be easily managed by a minor adjustment to the expansion device.

We also recommend that you overhaul your refrigeration system during the retrofit operation, including the filter drier and seals.

R442A has a lower mass flow than R404A, therefore we recommended that you check existing piping to ensure compatibility. You may have to replace your expansion valve in some circumstances.

R442A is fully compatible with the POE lubricants used in an R404A system. In many cases, the original oil can be used.

Trusted partner

The Gases Division of The Linde Group 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 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 – Ideas become solutions.