

Countdown to the introduction of R32

A step towards more environmentally friendly air conditioning systems.

The introduction of R32

New regulations regarding refrigerant use are being introduced all over the globe and the local markets are preparing for a transition to the use of more environmentally friendly refrigerants.

This paper looks at R32 as an alternative to R22, and examines its environmental and efficiency advantages in HVAC applications.

Background

These days, we all expect to be comfortable at home and at work, so when the summer heat really starts to hit, we simply hit the air conditioning switch. Similarly, when winter comes along, we switch on the central heating. Heating, Ventilation, Air Conditioning & Refrigeration equipment is one of the fastest-growing markets in the world.

However, this reliance on artificial temperature regulation has a negative impact on the environment, depleting the ozone layer, increasing CO₂ emissions and exacerbating climate change. Governments around the world are therefore introducing regulations in an effort to limit these negative environmental impacts.

The choice of refrigerant is a key factor. Ozone-depleting refrigerants are being phased out and

there is growing international pressure to move away from refrigerants with high Global Warming Potential (GWP). Refrigerant manufacturers are responding with the development of new products, and equipment manufacturers are designing more efficient technologies and systems that minimise refrigerant charge. They are also testing, selecting and qualifying new refrigerants.

The technological options for HVAC are expected to evolve over the coming years as the industry rises to the environmental challenge.

Which are the main refrigerants in use today, and which way is the industry heading?



Refrigerants - focus on Asia

In Asia today, the most popular refrigerants for small chiller and unitary products are R22 and R410A. R22 still dominates the market, since the technology is mature, costs are low and installation is easy.

However, this situation will soon change. R22 has a non-zero ODP (Ozone Depletion Potential) value, and is classified as one of the 'controlled HCFC substances'. Most countries in Asia has

committed to phasing out ozone-depleting substances in accordance with the control schedule of the Montreal Protocol.

In this phase-out, R32 and R410A are recommended as suitable replacements for the refrigerant R22, especially in the chiller and unitary air conditioning segment.

Low Global Warming Potential (GWP)

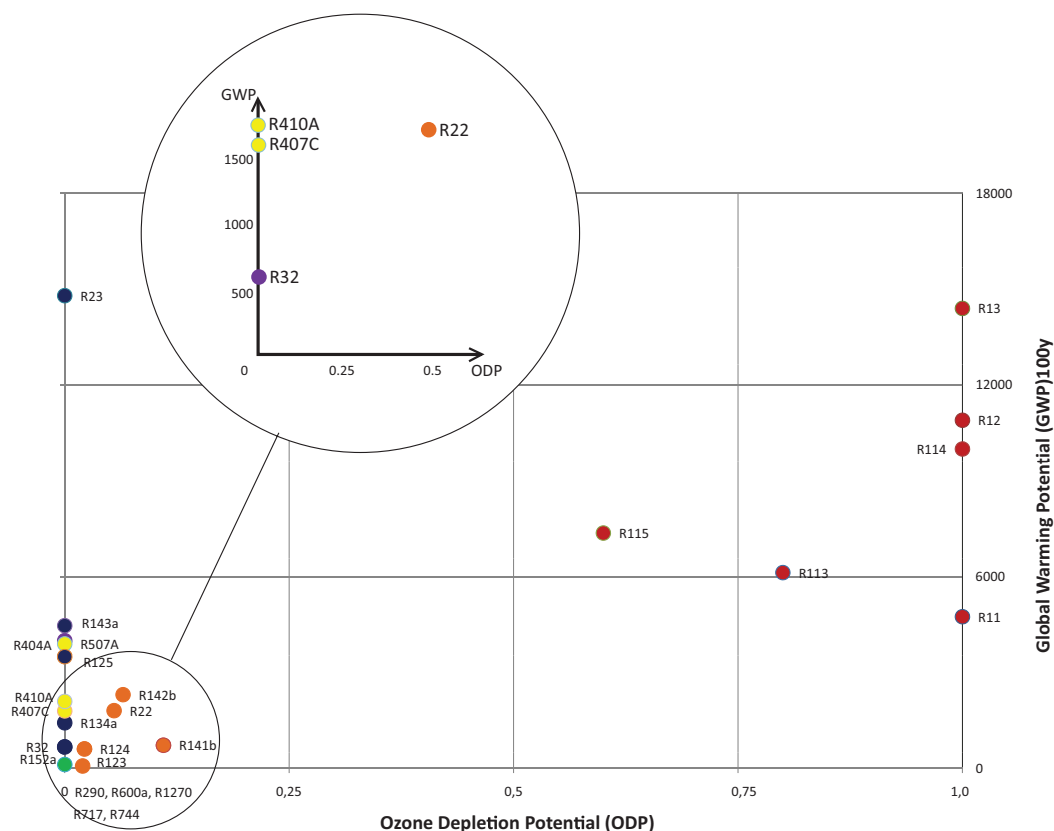
Most refrigerants have an influence on the atmosphere when they are released. This is due to either ozone depletion or the greenhouse effect. Different substances have more or less serious environmental impacts, varying between not substantial (e.g. CO₂) at one end of the spectrum to very significant (e.g. CFCs) at the other.

After the adoption of the Montreal protocol, R410A was introduced as a replacement for ozone-depleting refrigerants. Although R410A helped to reduce the problem of ozone depletion, it is nonetheless a greenhouse gas with a high GWP (see figure 1).

Thanks to its lower GWP value (i.e. low CO₂ emissions) R32 emerged as another suitable alternative to R22. It compares favourably with both R410A and R22 in terms of its direct global warming effect: only 23% of that of R410A and 26% of that of R22.

GWP is a measure of how much heat a refrigerant traps in the atmosphere, compared with a similar mass of CO₂. A low GWP therefore implies a low impact on global warming.

$$GWP (CO_2eq) + Quantity (\%kg) = GWP \times Quantity (CO_2eq \text{ kg})$$



Higher Volumetric Capacity

Compared with the refrigerant R410A, R32 has an approximately 20% higher volumetric capacity. This means that the required R32 volume charged to the system is lower than that for R410A.



A safe choice

R32 is mildly flammable with a low flammable concentration, a low energy of combustion and a low flame propagation speed. The flammable concentration of R32 is 14.4%, a level at which it cannot burn. At higher concentrations it can burn, but generates relatively little heat.

Systems are deemed safe when they comply with the upcoming Chinese safety standard for refrigeration, A/C and heat pumps, and are built with components which have been approved for R32.



**This paper was
produced by Danfoss**

Danfoss encourages the further development and use of low-GWP refrigerants to help slow down – and ultimately reverse – the process of global warming while helping to ensure continued global wellbeing and economic development along with the future viability of

our industry. We will enable our customers to achieve these refrigerant goals while continuing to enhance the energy efficiency of refrigeration and air conditioning equipment.

Danfoss A/S

Nordborgvej 81
DK-6430 Nordborg
Denmark
Telephone: +45 74 88 22 22
Fax: +45 7449 0949

Danfoss can accept no responsibility for possible errors in catalogues, brochures and other printed material. Danfoss reserves the right to alter its products without notice. This also applies to products already on order provided that such alterations can be made without consequent changes being necessary in specifications already agreed.

All trademarks in this material are the property of the respective companies. Danfoss and the Danfoss logotype are trademarks of Danfoss A/S. All rights reserved.
