R22: THE LONG GOODBYE

As one of the first countries to ratify the Montreal Protocol on substances that deplete the ozone layer, Australia has committed to phasing out almost all imports of hydrochlorofluorocarbons (HCFCs) by 2016. And as Sean McGowan reports, this includes the phase-out of the popular and common refrigerant R22.

Since ratifying the Montreal Protocol in 1989, Australia has continued to lead the world in the phase-out of ozone depleting substances.

This program’s success can largely be attributed to a co-operative partnership between industry, community and government, and the Ozone Protection and Synthetic Greenhouse Gas Management Act 1989, which provides a pathway for the country to meet its international obligations.

“...it is also important to dispel the myth that HCFCs will be illegal from 2016, including equipment containing HCFCs such as R22.

RECLAIM AND RECYCLE

According to the federal Department of the Environment, the HVAC&R industry has managed the phase-out well, with the transition to alternative technology almost complete.

"It is a credit to the industry that the phase-out has gone so smoothly," says a department spokesperson.

"When the phase-out was agreed, the industry wanted long-term certainty from the government, and the freedom to achieve the phase-out in a way that suited the conditions in Australia. The demand for virgin HCFCs has more or less tracked the availability of this gas, with demand reducing as equipment is replaced."

For the large quantity of installed equipment still operating on R22, it is expected that rededication and recycling of R22 will ensure that existing supplies will last longer and be available to service existing systems.

Anecdotally at least, far less HCFC is now being returned to Refrigerant Reclaim Australia for destruction – an indication perhaps that more HCFCs are being recovered and recycled.

Although this is to be expected as import quotas reduce, the Department says it increases the risk of gas that is not at specification being re-used. This could lead to poor equipment performance and the potential for premature equipment failure.

For this reason, technicians are required under the Ozone Protection and Synthetic Greenhouse Gas Management Regulations 1995 to test recovered refrigerant that is to be re-used to ensure it complies with ARI 700-2004.

Where systems are in good working order, retrofitting to an alternative refrigerant is not necessarily required; however, a thorough, ongoing servicing regime to minimise leaks will be critical.

The Department of the Environment says it is also important to dispel the myth that HCFCs will be illegal from 2016, including equipment containing HCFCs such as R22.

"HCFCs legally imported into Australia before 2016, including recovered and recycled HCFCs, and HCFCs legally imported into Australia between 2016 and 2029 under the annual 2.5 ODP tonne servicing tail, can continue to be used."

As a parallel example, there are still some CFC systems operating in Australia today, even though the import of CFCs was prohibited from 1995.

But like those systems still operating on CFCs, those operating on phased-out HCFCs like R22 could run the risk of being made redundant in the event of a major system failure beyond 2016.

It is for this reason that the industry has been exploring available retrofit alternatives, with some clients making the decision to switch their systems over now rather than be exposed to the risk of very expensive, or unavailable, refrigerant supplies.

EXPLORING RETROFITS

As part of its leading role with industry, the Air Conditioning and Mechanical Contractors’ Association of Australia (AMCA) has been working with members to keep them aware of their obligations, and assist them to manage the transition with information and training.

According to AMCA policy analyst Ben Hawkins, the industry’s approach to the phase-out of R22 varies...
greatly depending on each company’s expertise, capacity and customer knowledge.

“For example, some companies have strong in-house expertise in the application of drop-ins, whereas others are more proficient at conversions or plant replacement,” Hawkins says.

“This can be a significant factor as to what type of recommendation a company makes to a client: replace, refurbish or drop-in.”

Consequently, Hawkins says one of the greatest challenges for the industry has been the formation of a consolidated position on the range of options available – particularly around the suitability of replacement refrigerants.

Although several alternatives are available, Hawkins says it is important to be aware that these can result in undesirable consequences.

One of the most common of these is oil return to the compressor.

THE OPTIONS

It is important to consult with the original equipment manufacturer (OEM) on what alternative refrigerants might be suitable for your system. However, as a general overview, there are a number of refrigerants emerging as options, depending on the age, condition and type of system that was operating on R22.

These include HFC blend R427A.

According to Actrol’s website, R427A offers similar performance to R22, usually without any need for modification to the existing R22 installation. It can be used to retrofit low-temperature refrigeration equipment and air conditioning installations. Additionally, R427A is non-toxic and non-flammable, meeting the highest A1/A1 classification.

It requires polyolester (POE) lubricants but is tolerant of high levels of alkylbenzene or mineral oils of up to 10 per cent.

Another option for consideration is R438A, which Heatcraft says is suitable for retrofitting in small systems, direct expansion systems in residential and commercial air conditioners, direct expansion chillers, and medium and low-temperature refrigeration. Other HFC blends such as R407C and R407F might also be suitable in some systems.

Although these newer refrigerant blends have been designed as suitable drop-in replacements for R22 and are said to require only minimal changes to equipment, Hawkins warns that other issues also need to be considered.

Along with the potential issue of part availability further down the track, he says reliability of older equipment will also result in some uncertainty and future risk.

He says service technicians should also be aware of the disclaimers put on R22 drop-in alternatives by refrigerant manufacturers.

“While industry is being told by refrigerant manufacturers that several drop-ins are available, there is invariably a disclaimer citing the risk of oil return to the compressor and expansion valves,” says Hawkins.

While industry is being told by refrigerant manufacturers that several drop-ins are available, there is invariably a disclaimer citing the risk of oil return to the compressor and expansion valves.

“This diminishes the confidence of service technicians to recommend replacements as a viable alternative.”

Natural refrigerant alternatives might also be suitable for retrofitting; however, it is important to note that the use of flammable refrigerants in equipment not expressly designed for their safe use should be treated with the utmost caution.

R22 MYTHBUSTERS

**MYTH:**

**HCFCs will be illegal from 2016.**

**REALITY:**

HCFCs legally imported into Australia before 2016, including recovered and recycled HCFCs, and HCFCs legally imported into Australia between 2016 and 2029 under the annual 2.5 ODP tonne servicing tail can continue to be used.

**VERDICT:**

**MYTH:**

**R22 is being stockpiled ahead of 2016**

**REALITY:**

While HVAC&R Nation was unable to confirm this, anecdotal evidence suggests it might be the case. Businesses stockpiling R22 on site without the appropriate licensing or facilities create a health and safety hazard and are liable for heavy penalties if caught.

**VERDICT:**

**MYTH:**

**I have to replace or convert R22 equipment by 2016**

**REALITY:**

This is not the case. Equipment operating on R22 that is in good working order need not be retrofitted with an alternative refrigerant, nor does it need to be replaced. But remember that a quality maintenance regime is critical, as the availability and increased cost of R22 will impact from 2016.

**VERDICT:**

**MYTH:**

**NO合肥 will be illegal from 2016.**

**REALITY:**

Heatcraft says is suitable for retrofitting in small systems, direct expansion systems in residential and commercial air conditioners, direct expansion chillers, and medium and low-temperature refrigeration.

**VERDICT:**

**MYTH:**

**NO合肥 is being stockpiled ahead of 2016**

**REALITY:**

While HVAC&R Nation was unable to confirm this, anecdotal evidence suggests it might be the case. Businesses stockpiling R22 on site without the appropriate licensing or facilities create a health and safety hazard and are liable for heavy penalties if caught.

**VERDICT:**

**MYTH:**

**I have to replace or convert NO合肥 equipment by 2016**

**REALITY:**

This is not the case. Equipment operating on NO合肥 that is in good working order need not be retrofitted with an alternative refrigerant, nor does it need to be replaced. But remember that a quality maintenance regime is critical, as the availability and increased cost of NO合肥 will impact from 2016.

**VERDICT:**

**MYTH:**

**NO合肥 will be illegal from 2016.**

**REALITY:**

Heatcraft says is suitable for retrofitting in small systems, direct expansion systems in residential and commercial air conditioners, direct expansion chillers, and medium and low-temperature refrigeration.

**VERDICT:**

**MYTH:**

**R22 is being stockpiled ahead of 2016**

**REALITY:**

While HVAC&R Nation was unable to confirm this, anecdotal evidence suggests it might be the case. Businesses stockpiling R22 on site without the appropriate licensing or facilities create a health and safety hazard and are liable for heavy penalties if caught.

**VERDICT:**

**MYTH:**

**I have to replace or convert R22 equipment by 2016**

**REALITY:**

This is not the case. Equipment operating on R22 that is in good working order need not be retrofitted with an alternative refrigerant, nor does it need to be replaced. But remember that a quality maintenance regime is critical, as the availability and increased cost of R22 will impact from 2016.
According to Greg Picker, executive director for Refrigerants Australia, it is important that when considering hydrocarbons as a replacement, the OEM be consulted.

“We have no problem with any system being converted to hydrocarbon, provided there is appropriate engineering from the manufacturer saying it is safe,” Picker says.

He says this provision is critically important, not only to ensure equipment safety but also to ensure you are getting the same energy-efficiency output that you would expect to get from a piece of equipment.

“These are the minimum steps I would take as a consumer,” Picker says, “to ensure my family was protected and my energy bills were also low as they should be.”

Importantly, no matter what alternative refrigerant you are considering as a substitute for R22, you must check the relevant legislation in your state or territory to ensure the use of the gas is permitted and it is safe to do so.

TO ACT, OR NOT TO ACT

Your first option when considering the phase-out of R22 is, of course, to do nothing.

However, inaction may expose you and your client to an increasingly scarce and thereby more expensive supply of R22.

Therefore, developing a refrigerant plan should be your first step – even if the result is that you do nothing in the short term.

By conducting an equipment audit, you can examine what existing R22 equipment you or your client has, and look at its maintenance record, age, energy consumption and role. Determine the risk of failure to the business too – is the R22 equipment critical to business operations?

From this information, develop a plan that details what equipment needs to be replaced, and in what order, and what equipment you will retain.

Start talking to refrigerant suppliers now about the drop-in or near drop-in replacement refrigerants available. Even if you are not planning a retrofit now, be aware of the alternatives in case there is a problem.

And most importantly, look at improving the maintenance regime of existing R22 equipment. Preventable leaks are not only illegal, but they are soon to cost even more money to rectify.

When decommissioning existing R22 equipment, recover any refrigerant that is in good condition and safely store it for future use. This will allow you to extend the life of other equipment by using what you already own.

If the refrigerant is contaminated it should be returned, via your refrigerant wholesaler, to Refrigerant Reclaim Australia to be safely destroyed.

And finally, remember that ignorance is no excuse.

“As an industry we shouldn’t be surprised – we’ve known this [the phase-out] was going to happen for some time,” Picker says.

“Will there be problems as we work our way through the issues? Of course there will. But we’ve done this before. We’ve had ample notice and we’ll be able to manage this time too.” ▲