

# Optimise performance of your commercial refrigeration and cooling systems



**VICTORIA**  
State  
Government

Save on energy costs and reduce your environmental footprint



# About this guide

This guide is helpful to anyone who operates commercial refrigeration and cooling equipment, such as split and ducted air conditioning, chillers and cold rooms.

Equipment like this is commonly used by hospitality venues, manufacturers, food processors and cold storage supply chains.

Refrigeration and cooling systems can use a lot of energy and, if not properly maintained, may leak refrigerants. These are potent greenhouse gases that damage the environment.

Optimising the operation and maintenance of refrigeration and cooling equipment will reduce leakage of refrigerant gases and help you save on energy costs.



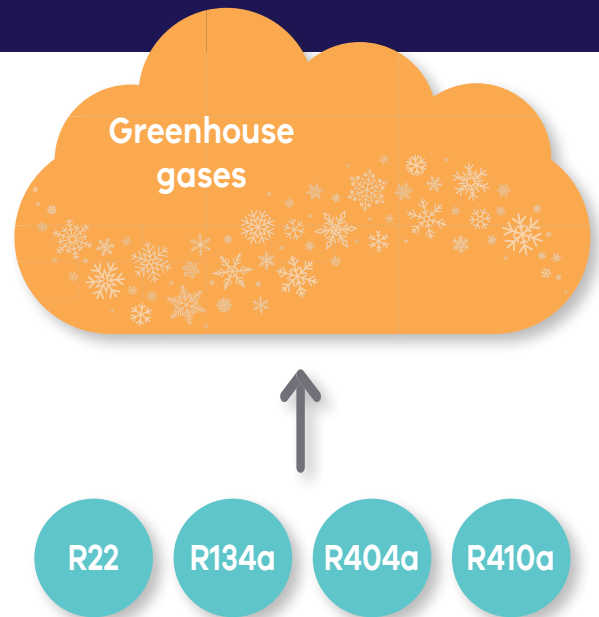


# Refrigerant gases

Most gases used in refrigeration and cooling equipment are called hydrofluorocarbons or HFCs. The most common HFCs are R22, R134a, R404a and R410a. While they're great at keeping things cool, they also have a significant drawback; they can be hundreds to thousands of times more damaging than carbon dioxide (CO<sub>2</sub>) in contributing to climate change and ozone depletion (per unit of mass).

Because HFCs are so damaging to the environment, it's important to use a fully-licensed air conditioning contractor to handle these refrigerants properly.

The contractor should have a licence issued by the Australian Refrigeration Council (ARC). You can locate ARC-licensed businesses and individuals in your area on: <https://www.lookforthetick.com.au/>



## Only an ARC-licensed contractor will be able to correctly:

1

### CHECK FOR REFRIGERANT GAS LEAKS

This is possibly the single most important measure to improve the performance of your refrigeration and cooling equipment.

Regular scheduled servicing by an ARC-licensed contractor should always include checking for leaks.

You can also install automatic refrigerant detection equipment at high-risk leakage points.

2

### DISPOSE OF REFRIGERANT GASES APPROPRIATELY

When it's time to replace your equipment, you need an ARC-licensed contractor to safely remove the refrigerant gases from your old system.

Refrigerant gases are 'controlled substances' and removing them from your old equipment requires specialised tools, which are only available through an ARC-licensed contractor.

ARC-licensed contractors are legally required to remove the refrigerant and take it to an authorised collection/reclaim centre, where it's processed and safely transformed into substances that don't deplete the ozone layer or contribute to global warming.

Non-compliance with this requirement can cause damage to the environment, and result in a substantial fine.

3

### USE ALTERNATIVE GASES

New types of refrigeration and cooling equipment use natural refrigerants as an alternative to HFCs (e.g., ammonia, CO<sub>2</sub>). These are more environmentally friendly, and also deliver good energy efficiency.

If it's time to replace your equipment, ask your supplier or ARC-licensed contractor for equipment options that use natural refrigerant gases. Keep in mind that, while equipment using HFCs might currently be cheaper than equipment using natural refrigerants, with HFCs due to be phased-out under international law, this will likely change. The phase-out will reduce supply of HFCs and increase the cost of equipment using these gases compared with equipment using natural refrigerants.

# Energy use

As well as having your refrigeration equipment regularly checked by an ARC-licensed contractor there are many things you can do to lower your energy consumption and costs.

## Optimise your layout

**Plan the layout of your equipment to support energy and cost savings. If you're unsure where to start, discuss your needs with an ARC-licensed contractor. They're fully qualified to advise you on the best layout.**

Easy options include:

- \* avoid over-sizing equipment
- \* avoid excessive pipe lengths and uninsulated pipework
- \* reduce the time staff need to be in cold rooms by placing high-turnover products near the door for easy access
- \* ensure cooling equipment is located well away from heat sources such as sunlight and other equipment
- \* optimise lighting using LED where possible
- \* arrange the evaporator so cold air doesn't blow straight out the door
- \* locate condensers and heat exchangers where there is good airflow and waste heat can be discharged
- \* optimise routing of suction lines to avoid pressure drops, liquid retention or unstable flow
- \* use programmable thermostats so you can adjust the temperature when no one is around.

## ROUTINE MAINTENANCE

The easiest way to keep your refrigerant and cooling equipment operating efficiently is through regular servicing of all components, in line with the manufacturers' recommendations. Regular scheduled servicing will help reduce gas leaks, ensure efficiency and temperature control, and minimise equipment problems and/or failure.

When it comes to choosing a service technician, only an ARC-licensed contractor can provide the professional skills that will enable optimum performance of your equipment. These include checking:

- \* overall compressor operation
- \* control wiring and electrical connections
- \* suction line insulation
- \* refrigerant levels
- \* oil levels
- \* thermometer operation and accuracy
- \* fan motors and blades.

They can also pressure clean equipment drain lines, and provide advice on how to keep your equipment operating efficiently.

## EQUIPMENT CHECKLISTS

Along with regular servicing there are some easy ways to ensure your equipment runs smoothly – saving you energy and money.



## REFRIGERATION

Tip	Description	Frequency	✓
Keep the fridge full – but not too full	Keeping the fridge at close to its optimum storage capacity is more efficient than running it half-full. But avoid overstocking to ensure stored stock doesn't block airflow to and from the evaporators or air grills.	Daily	<input type="checkbox"/>
Don't allow stock to warm up during transfer	Prevent warming of refrigerated stock by transferring it to your fridge/cold room/freezer as soon as it arrives. Re-cooling warmed stock uses extra energy.	Daily	<input type="checkbox"/>
Switch off lighting	Lights in a refrigerated space introduce a heat load to the system. They should be turned off when leaving the room.	Daily	<input type="checkbox"/>
Close the door	Moisture from ambient air entering a cold room can cause frost to form on evaporators, stock, the ceiling and floors. Ensure doors are self-closing, and that they seal tightly and quickly. Use strip curtains wherever possible.	Daily	<input type="checkbox"/>
Check thermostat and defrost settings match conditions	Keep an eye on settings, including temperature controls and defrost frequency. This will ensure your equipment performs at optimal levels. Setting the temperature too low or defrosting more often than necessary forces the equipment to work harder than it needs to, using more energy and potentially decreasing its overall life expectancy.  Select the optimum temperature and humidity for the type of stock being stored, and no colder. Temperature sensors should also be regularly checked and calibrated.	Quarterly	<input type="checkbox"/>
Cleaning	As well as regular cleaning of your equipment, it should be deep cleaned a few times a year. Deep cleaning gives you the opportunity to carefully examine all areas, and check for any unexplained wear or damage.	Quarterly	<input type="checkbox"/>
Door seals	Check the seals of your refrigeration units by inspecting all four sides of the seal around each door. Look for gaps or tears that could be letting warm air in. This is also a good time to clean the seals with warm, soapy water to remove any food residue or other debris that might compromise their function.	Bi-annually	<input type="checkbox"/>
Door hinges and latches	Broken or misaligned door hinges and latches will allow warm air to seep in. Checking these components regularly will ensure they are undamaged and properly aligned.	Bi-annually	<input type="checkbox"/>
Condenser coils	The condenser coils remove heat from the interior of the refrigeration unit to the outside. Clean coils enable your equipment to perform at optimum efficiency, and reduce the amount of energy needed to maintain correct temperatures.	Bi-annually	<input type="checkbox"/>



## COOLING EQUIPMENT

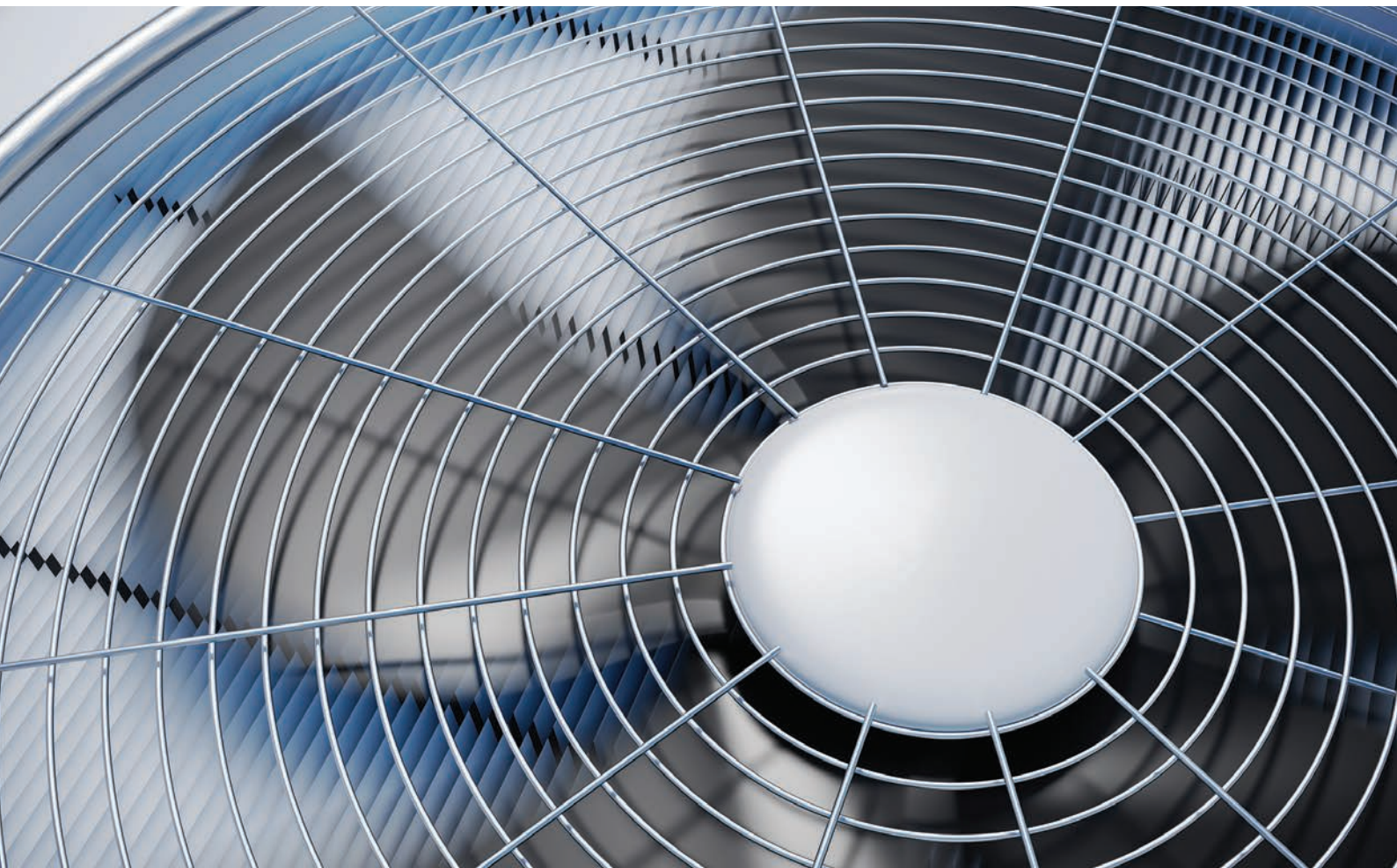
Tip	Description	Frequency	<input checked="" type="checkbox"/>
Change air filters regularly	Some manufacturers suggest changing air filters every month, while others suggest every three months. Refer to the equipment manual for the manufacturer's recommendations. A dirty filter reduces air flow, overworks the system and wastes energy.	Monthly/Quarterly	<input type="checkbox"/>
Seal your cooling ducts	Ducts move air to and from a central air conditioner. If they're not sealed properly, you'll waste a lot of energy (and money). Ducts should be sealed and insulated, particularly those running through crawl spaces, attics, and unheated basements.	Quarterly	<input type="checkbox"/>
Eliminate cooling loss	Check for leaks around windows and doors, and for other places cool air may escape.	Bi-annually	<input type="checkbox"/>

## TIME FOR AN UPGRADE?

If your equipment is reaching its end-of-life and has recurring problems, it might be time replace it. Replacing old, inefficient equipment with new, energy-saving alternatives will help lower your energy costs and reduce greenhouse gas emissions.

The upfront cost of the equipment will pay for itself over time. By switching to energy-saving equipment, Victorian small businesses can save 15–20 per cent on annual energy costs.

There are also different types of support provided by government to help you upgrade. A list of available financial incentives and grants for energy efficiency can be found at Victorian Energy Upgrades (<https://www.energy.vic.gov.au/energy-efficiency/victorian-energy-upgrades>) and Sustainability Victoria ([www.sustainability.vic.gov.au](http://www.sustainability.vic.gov.au)).



# Why has this guide been developed?

## VICTORIA'S COMMITMENT TO NET-ZERO EMISSIONS BY 2050

The Victorian Government has committed to net-zero emissions by 2050 under the *Climate Change Act 2017*. Part of this commitment is reducing emissions from refrigerant gas leaks in refrigeration and cooling equipment. In 2018, refrigerant gas leakage constituted almost 3 per cent of Victoria's total emissions.

## VICTORIA'S GENERAL ENVIRONMENTAL DUTY

A new legal framework, the 'General Environmental Duty' (GED), came into effect in Victoria on 1 July 2021. The GED requires people who engage in an activity that poses a risk of harm to human health or the environment from pollution or waste (such as greenhouse gas emissions) to minimise those risks, so far as reasonably practicable.

This applies to operators of commercial refrigeration and cooling systems. It means that systems must be properly maintained and operated to minimise the risk of releasing greenhouse gases into the atmosphere and harming human health and the environment.

In practice, you won't necessarily have to do anything differently. Most people already maintain and operate their refrigeration and cooling systems in compliance with the GED.

However, under the GED, you're also required to have 'reasonable knowledge' about the potential risks the operation of your refrigeration and cooling systems can pose to the environment, and how to address them. The information in this guide can help you reduce these risks, and your overall environmental footprint. Saving energy also saves you money.

## AUSTRALIA'S COMMITMENT TO PHASE-DOWN HYDROFLUOROCARBONS

Under an international agreement known as the Montreal Protocol, Australia has committed to reducing the use of HFCs by 85 per cent by 2036. This means you can continue to use your HFC equipment until the end of its useful life. But when it's time to replace your equipment, you'll need to explore newer technologies that are now available, which use fewer HFCs or non-HFC refrigerant alternatives such as ammonia, CO<sub>2</sub> and hydrocarbons.

## RESOURCES

Australian Refrigeration Council  
<https://www.lookforthetick.com.au/>

Australian Institute of Refrigeration, Air conditioning and Heating (AIRAH)  
<https://www.airah.org.au/>

*Climate Change Act 2017*  
<https://www.climatechange.vic.gov.au/legislation/climate-change-act-2017>

General Environmental Duty (GED)  
<https://www.epa.vic.gov.au/for-business/new-laws-and-your-business/general-environmental-duty>

Industrial Processes and Product Use (IPPU) Sector Pledge  
<https://www.climatechange.vic.gov.au/victorian-government-action-on-climate-change/IPPU-sector-pledge-accessible.pdf>

International HFC phase-down  
<https://www.awe.gov.au/environment/protection/ozone/hfc-phase-down/international-hfc-phase-down>

Leaks, maintenance and emissions: Refrigeration and air conditioning equipment, Department of Agriculture, Water and the Environment (Cwlth)  
<https://www.awe.gov.au/environment/protection/ozone/publications/leaks-maintenance-emissions-refrigeration-air-conditioning-equipment>

Montreal Protocol on Substances that Deplete the Ozone Layer (the Montreal Protocol)  
<https://www.awe.gov.au/environment/protection/ozone/montreal-protocol>

Ozone Protection and Synthetic Greenhouse Gas Management Legislation  
<https://www.awe.gov.au/environment/protection/ozone/legislation>

Victorian Government Action on Climate Change  
<https://www.climatechange.vic.gov.au/victorian-government-action-on-climate-change#pledges>





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