



# COOLCHANGE

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## Licence numbers hit record high

The number of licences issued continues to climb to unprecedented heights, recently exceeding 83,000 individuals and businesses. This continued success reflects the industry's commitment to raising the level of skills, while delivering real environmental outcomes.

Much of the success of the ARCTick licence scheme results from the genuine partnership between industry, via the ARC and the Government. It is a partnership that delivers on Australia's environmental policy objectives, and it is a partnership that has industry at its core.

This collaborative effort has seen Australia's management of environmentally damaging refrigerants voted 'best in the world' by the USA Air Conditioning, Heating and Refrigeration Institute (AHRI)^.

According to a report by Expert Group (2015) commissioned by the Australian Government, 'since 2003, the work of ARC-licensed businesses and technicians has contributed to 24.37 megatonnes of CO<sub>2</sub>-e direct emissions reductions. The ARC licence scheme will continue to provide significant direct and indirect emissions savings over the next two decades, with further direct emissions reductions estimated at 58.02 Mt CO<sub>2</sub> projected to 2030.'

^Research Project 8018, Review of Refrigerant Management Programs, was designed to compare refrigerant management and recycling programmes implemented in key regions of the world, evaluate their effectiveness, and determine best practices.

\*Expert Group, Assessment of environmental impacts from the *Ozone Protection and Synthetic Greenhouse Gas Management Act 1989*, April 2015.



**RTA audit  
checklist**  
> read more inside

# Lubricating oil flammability

Lubricating oils used in refrigeration and air conditioning systems can burn, so care must be taken by service technicians to prevent them from catching fire.

Prior to the phase-out of CFC refrigerants, mineral oils were the primary oils used in refrigeration and air conditioning systems. However, mineral oils are not suitable for use with new HFC and HFO refrigerants. As a result, synthetic oils such as alkyl benzene, polyol ester, polyalphaolefins and polyalkaline glycols were developed to meet the requirements.

You should use only the lubricant recommended by the compressor manufacturer. Oil producers and compressor manufacturers go to great lengths and expense to develop and test new lubricants. There are tests for viscosity, floc point, pour point, flash point, etc.

**Two of the important properties of refrigerant oils are:**

**FLASH POINT:** The flash point is the lowest temperature to which a lubricant must be heated before its vapour will ignite when mixed with air and in contact with a naked flame, but it will not continue to burn when the flame is removed. The flash point varies from 90 to 250°C

**FIRE POINT:** The fire point is the temperature at which lubricant combustion will be sustained. The fire point for a lubricant is usually 8 to 10 percent above the flash point.

**This means that if synthetic oils are exposed to any naked flames, while silver brazing for example, they will catch fire, burn and produce toxic and irritating fumes, CO and CO<sub>2</sub>.**

For people with a stationary refrigerant handling licence this would have been covered in the relevant qualification's unit of competency on recovering, pressure testing, evacuating, charging and leak testing of refrigerants.

Service technicians are therefore reminded of this fire hazard and the procedures to:

- Prevent synthetic oil from catching fire, which is to ensure it is not exposed to naked flames while servicing the refrigeration/air conditioning equipment.
- Extinguish the oil fire in the recommended manner. Generally, this means removing the naked flame and using dry chemical, foam or carbon dioxide fire extinguishers, not water.

Remember to always refer to the oil manufacturer's Material Safety Data Sheet (MSDS) for its specific flammability, extinguishing media and hazardous combustion product details.

## Australian industry supports the Pacific move to new technology

*Australian industry is continuing to help our neighbours in the Pacific move to newer, more efficient and more environmentally friendly refrigeration and air conditioning equipment.*

Leading industry players formed the backbone of the Pacific Island Low-GWP Technology summit held in Fiji from 16-18 June 2016. The summit was the first time refrigeration and air conditioning industry groups, technicians and government officials have come together to consider the safe introduction of low-GWP (Global Warming Potential) technologies in the Pacific. It featured equipment displays, installation and servicing demonstrations, and presentations on introducing low-GWP technologies. 300 people from 36 countries attended the summit.

Australian and local industry representatives and trainers (including from Fujitsu NZ, Daikin, Sanden, the Air-conditioning and Refrigeration Equipment Manufacturers Association of Australia and Australian Refrigeration Council) provided information and demonstrations on four technologies currently in use in the Pacific – R600, R744, R32 and CO<sub>2</sub>. The summit was an initiative of the former Minister for the Environment, Greg Hunt. The summit was held to boost support for a global agreement to phase-down HFC (hydrofluorocarbon) use under the Montreal Protocol by demonstrating that these newer low-GWP technologies can be installed and serviced safely with the right training and tools.

The Australian Government and industry are strong supporters of a global HFC phase-down. A global phase-down will provide long term investment certainty and accelerate commercialisation of new technology, modern training and standards.



**Left to right:** Bruce Edwards, Assistant Secretary, Department of the Environment and Energy; Joshua Morgan, Policy Officer, Department of the Environment and Energy; Mark Padwick, President, Air-conditioning and Refrigeration Equipment Manufacturers Association of Australia; Glenn Evans, CEO, Australian Refrigeration Council; Robert Beggs, General Manager – Manufacturing, Daikin; Kylie Farrelley, Business Manager, Arkema; Clifton Madgwick, Business Manager, Chemiplas; Annie Gabriel, Assistant Director, Department of the Environment and Energy; Michael Moller, Praxis Vocational.

## Compliance activities for the 2015/16 financial year

The Department of the Environment and Energy's Compliance and Enforcement Branch (the Department) detects, deters and investigates non-compliance with the *Ozone Protection and Synthetic Greenhouse Gas Management Act 1989* and the *Ozone Protection and Synthetic Greenhouse Gas Management Regulations 1995*.

The Department works collaboratively with the Australian Refrigeration Council (the ARC) and is responsible for:

- ensuring individuals and businesses that handle or trade ozone-depleting substances or synthetic greenhouse gases have the required licence or trading authorisation.
- monitoring the compliance of individuals and businesses with the conditions of the licences, trading authorisations or permits.
- gathering and analysing information on trends and developments within the ozone community to support efforts to improve compliance.
- investigating incidents of suspected non-compliance referred to the Department.

From 1 July 2015 to 30 June 2016, the Department received 251 referrals from the ARC for suspected non-compliance. The activities that were undertaken by the Department in the past 12 months have included:

- 92 monitoring inspections of trading authorisation and permit holders' business premises. 87 businesses (95%) that were subject to an inspection were quickly brought into compliance with conditions and no further action was necessary.
- The majority of these referrals related to suspected non-compliance with trading authorisation conditions. The remainder were suspected of operating without an appropriate permit.
- 97 investigations into alleged refrigerant discharges and unlicensed activity. A recent example was working with an ice skating facility to identify and address the discharge of refrigerant from a leaking cooling system. The facility has since replaced the leaking system with a brand new glycol system.
- Refusal of one permit on the basis that the applicant was not a fit and proper person to hold a licence. This case constituted the first use of the fit and proper person provisions.
- Removal of four advertisements that were selling disposable cylinders on various websites.
- Ongoing enquiries into industry members' allegations of suspected non compliance. To date, seven out of the eight cases have been found compliant with the requirements of the Act and Regulations.

If you have information about the illegal discharge of ozone depleting substances or synthetic greenhouse gases, or other non-compliance with the requirements of the licensing and permit scheme, you can report it to the Department at: [ozone.compliance@environment.gov.au](mailto:ozone.compliance@environment.gov.au) or to the ARC at [enquire@arctick.org](mailto:enquire@arctick.org). Information is welcomed and held in strict confidence.

# Natural refrigerants training – stationary systems

Natural refrigerants training in safety awareness and servicing of stationary refrigeration and airconditioning systems is becoming available to technicians across the country.

Low GWP refrigerants have their own unique characteristics and can be flammable and/or toxic, or have to operate at extreme pressures. To meet Work Health and Safety obligations and ensure the equipment is safe, existing refrigeration and air conditioning workers require further training to safely handle the alternative refrigerants before they install, commission, service and repair stationary refrigeration and air conditioning systems that use a natural or flammable synthetic refrigerant.

Listed below are the national natural refrigerant competency standard units available either as gap training for existing workers or as electives in the Certificate III in Refrigeration and Air Conditioning trade qualification:

## Hydrocarbons

### **UEENEEJ174A Apply safety awareness and legal requirements for hydrocarbon refrigerants**

This unit covers the safety and legal requirements to handle, use and store hydrocarbon refrigerants. All safety aspects are covered to Australian and international standards. Legal requirements are covered at local, state and national level.

### **UEENEEJ175A Service and repair self-contained hydrocarbon air conditioning and refrigeration systems**

This unit covers specialised procedures for servicing and repairing self-contained air conditioning and refrigeration equipment using hydrocarbon refrigerant. It reinforces safe working practices and covers specialised knowledge of refrigeration principles that apply to hydrocarbon, following service manuals, testing, locating and rectifying faults and defective components and completing the necessary service documentation.

## Carbon Dioxide

### **UEENEEJ184A Apply safety awareness and legal requirements for carbon dioxide refrigerant**

This unit covers the safety and legal requirements to handle, use and store carbon dioxide refrigerant. All safety aspects are covered to Australian and international standards. Legal requirements are covered at local, state and national level.

### **UEENEEJ185A Repair and service carbon dioxide refrigeration systems**

This unit covers specialised procedures for servicing and repairing refrigeration equipment using carbon dioxide (CO<sub>2</sub>) as a refrigerant excluding self-contained systems. It reinforces safe working practice and

covers specialised knowledge of refrigeration principles that apply to carbon dioxide, following service manuals, testing, locating and rectifying faults and defective components and completing the necessary service documentation.

### **UEENEEJ188A Repair and service self-contained carbon dioxide refrigeration and heat pump systems**

This unit covers specialised procedures for servicing and repairing self-contained refrigeration and heat pump equipment using carbon dioxide (CO<sub>2</sub>) as the refrigerant. It reinforces safe working practice and covers specialised knowledge of refrigeration principles that apply to carbon dioxide, following service manuals, testing, locating and rectifying faults and defective components and completing the necessary service documentation.

## Ammonia

### **UEENEEJ178A Apply safety awareness and legal requirements for ammonia refrigerant**

This unit covers the safety and legal requirements to handle, use and store ammonia refrigerant. All safety aspects are covered to Australian and international standards. Legal requirements are covered at local, state and national level.

### **UEENEEJ179A Repair and service ammonia refrigeration systems**

This unit covers specialised procedures for servicing and repairing refrigeration equipment using ammonia as the refrigerant. It reinforces safe working practice and covers specialised knowledge of refrigeration principles that apply to ammonia, following service manuals, testing, locating and rectifying faults and defective components and completing the necessary service documentation.

### **UEENEEJ196A Operate Ammonia Refrigeration Plant**

This unit covers specialised procedures for operating an industrial refrigeration plant using ammonia as the refrigerant. It encompasses applying specialised knowledge of refrigeration principles that apply to ammonia, specifying the normal operating parameters for the plant, rectifying faults and defective components within organisational guidelines and completing the necessary service documentation.

Training in these units is now available through over 30 registered training organisations (RTO) across the country who have been approved to deliver these units by the Australian Skills Quality Authority.

You can view the units and search for an RTO at <http://training.gov.au/Home/Tga>

Enter the unit code, for example UEENEEJ174A, in the Nationally recognised training box and press 'Search'. Click on 'Find RTOs approved to deliver this unit of competency' and a list of training organisations approved to deliver the unit will be provided with their contact details.

A new unit of competency has been drafted for handling A2 flammable synthetic refrigerants, which includes R32, however it is yet to be approved for delivery. In the meantime, technicians should refer to AIRAH's Flammable Refrigerants Safety Guide available at: <http://www.airah.org.au>

## Call for directors – at ARC AGM in November

The ARC is calling for nominations from suitably qualified people to fill a vacancy on the ARC's refrigeration and air conditioning industry Board.

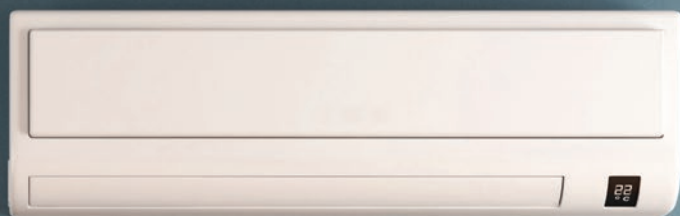
To be eligible, you need to be a representative of an ARC member organisation, and your nomination be voted on by the ARC membership. For this vacancy, the potential nominee must also be from the stationary sector (refrigeration and air conditioning). The ARC board consists of three directors responsible for the stationary sector and three directors responsible for the automotive (mobile) sector, with the ARC CEO acting as executive director. To nominate email [enquire@arctick.org](mailto:enquire@arctick.org) to request a nomination form. Nominations must be submitted by 11th November. The ARC membership currently includes thirteen organisations.

Visit [www.arctick.org/information/about-arc/arc-members](http://www.arctick.org/information/about-arc/arc-members) to see a list of ARC member associations. Organisations wanting to join the ARC membership can do so by completing an 'application for admission'. The application will then be considered by the Board. To become a stationary or mobile sector member of the ARC, the group must satisfy the following criteria:

- be a not for profit organisation
- be a national body
- be active in refrigeration and air conditioning industries.

Interested organisations can contact ARC at [enquire@arctick.org](mailto:enquire@arctick.org)





# Are you installing or servicing a banned system?

Household refrigerators and air conditioners sold in Australia that fall within the scope of the Greenhouse and Energy Minimum Standards (GEMS) regulation must be registered with the GEMS Regulator.

In addition, household refrigerators offered for supply must display an energy rating label and meet the minimum energy performance standards (MEPS). Most air conditioners are also required to display an energy rating label when offered for supply and are also required to meet MEPS. But not all systems operate as claimed by their suppliers and this has resulted in several high-profile air conditioning and refrigeration systems being banned or suspended from further supply.

This is where technicians come in. Your customers rely on you for advice in choosing the appliance that best meets their needs and energy efficiency is often one of the factors. Energy rating labels are great indicators for this. But recently some air conditioning and refrigeration systems haven't come up to scratch in relation to their energy efficiency. Below is a list of models suspended or banned by the GEMS Regulator.

If you come across products that are on the list of cancellations and are being offered for supply or have been recently installed, contact the E3 compliance mailbox – [E3.Compliance@environment.gov.au](mailto:E3.Compliance@environment.gov.au)  
Visit <http://www.energyrating.gov.au/document/list-suspended-or-cancelled-gems-registrations> to read more.



Product	Brand	Model	Family of Models (also covered by Suspension or Cancellation)	Reason for suspension or ban	Date of cancellation
Air conditioner	ICE Solair	ICE(RC)-60WM	N/A	Failed to meet: AEER at rated capacity by -10.37%; ACOP at rated capacity by -2.45%; Capacity (Cooling) by -13.23%; Capacity (Heating) by -11.54%; EER by -10.19%	7/09/2016
Air conditioner	Dunnair	PHS 12	PHS 12, PHSE 12	Failed to meet: AEER at rated capacity by -45.42%; ACOP at rated capacity by -49.13%; Capacity (Cooling) by -12.56%; Capacity (Heating) by -36.66%; AEER by -45.59%; and ACOP by -49.76%	05/09/2016
Air conditioner	SolAir World	SWW(R)-7.2GW	N/A	Failed to meet: AEER at rated capacity by -16.37%; ACOP at rated capacity by -15.80%; Capacity (Cooling) by -22.37%; Capacity (Heating) by -25.42%; AEER by -16.16% and ACOP by -19.98%.	18/5/2016
Air conditioner	Pioneer International	GTIO-100A6/GTE-100A6	N/A	Failed to meet: AEER at rated capacity by -18%; ACOP at rated capacity by -8.1%; Capacity (Cooling) by -40.3%; Capacity (Heating) by -38.3%; AEER by -41.4% and ACOP by -36.4%.	5/11/2015
Air conditioner	Olimpia Splendid	Unico 9hp AUNZ	N/A	Failed to meet: AEER at rated capacity by -32.67%; ACOP at rated capacity by -11.39%; Capacity (Cooling) by -12.78%; Declared Effective Power Input (Cooling) by -38.88%; AEER by -34.20% and ACOP by -14.72%.	30/10/2014
Household refrigerating appliance	Husky	HUS-RETRO130RED	RETRO130 Series, HUS-RETRO130WHT, HUS-RETRO130BLK, HUS-RETRO130GRN, HUS-RETRO130BLU, HUS-RETRO130PNK	The tested PAEC exceeded the value declared on the Energy Rating Label by 12.8%.	18/8/2014
Air conditioner	IP Solar Hybrid	(IP) 35GW	N/A	Failed to meet: AEER at rated capacity by -18.40%; ACOP at rated capacity by -20.79%; Capacity (Cooling) by -9.54%; and Capacity (Heating) by -9.34%.	11/12/2013

# Tips for your RTA audit – don't risk your business!

If your business holds a Refrigerant Trading Authorisation (RTA), then you need to have in your possession specific equipment and records.

All companies (or individuals) that hold a RTA may be audited by the Australian Refrigeration Council (ARC). Not only is the audit process a means to ensure RTA holders are meeting their obligations under the Australian Government's *Ozone Protection and Synthetic Greenhouse Gas Management Regulations 1995* (the Regulations), it is also a great opportunity to make sure you are managing your paperwork and equipment in the most efficient and accurate way. And that can only be a good thing for your business!

## ARC FIELD OFFICERS ARE FINDING THE MAIN AREAS FOR NON-COMPLIANCE AT AUDIT ARE:

- no equipment maintenance records
- no cylinder leak test records
- no risk management plan around emissions of refrigerant.

## COMPLIANCE TIPS

There are a number of basic actions and conditions an authorisation holder must take to ensure they are complying with the Regulations. Remember, no valid RTA means no refrigerant gas. On this page is an illustrated checklist to assist RTA holders. Pass this around the office/workshop or stick it on the wall to help you.

**Equipment Maintenance Records** Authorisation No.: AU \_\_\_\_\_

Quarter ending: \_\_\_\_\_ Page No: \_\_\_\_\_

Date in Quarter	Equipment Type	Make	Model	Serial No.	Action Taken

*Images used as examples only.*

## Equipment maintenance records

**Cylinder Leak Test & In-Test Date Records** Authorisation No.: AU \_\_\_\_\_

Quarter ending: \_\_\_\_\_ Page No: \_\_\_\_\_

Refrig. Type	Cylinder Owner	Cyl. Serial Number	Date Leak Tested	In-Test Exp. Date	Name of person who checked

## Cylinder leak test records

**Risk Management Plan Guide**

\*The Australian and New Zealand Refrigerant Handling Code of Practice 2007  
\*\*The Australian Automotive code of Practice 2008

Activity	Potential Hazards/Risks	Australian Standards and Code of Practice Reference	Risk Control measures	Name of responsible person	Next RMP review date (at least annually)
Purchasing Refrigerant	Loose or damaged Cylinder caps.	AS 2630.1 AS 4332 *COP Com **COP Auto	On receipt check cylinders are tightly capped with sealing caps. Run leak detector around the valve area under the wrapping to check for leaks. Record weight.	John Smith	Oct 2016

## Risk management plan around emissions of refrigerant

## RTA AUDIT CHECKLIST

### ☐ EQUIPMENT LIST

Make sure you keep quarterly records of inspection and/or maintenance of the equipment, and ensure it is working correctly.



Electronic leak detector



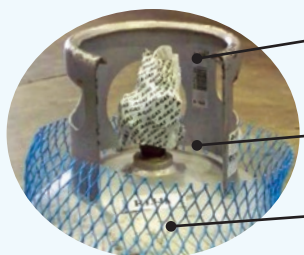
Vacuum pump



Refrigerant recovery unit

### ☐ REFRIGERANT GAS CYLINDERS

A list of all refrigerant containers (cylinders) in your possession during each quarter and their test dates. In addition, quarterly records that show you have checked your cylinders for leaks, at least once during the quarter.



**Cylinder serial number**  
(generally stamped into the handle/collar of the cylinder)

**Cylinder test date**  
(generally stamped into the handle/collar of the cylinder)

**Refrigerant type**

### ☐ RISK MANAGEMENT PLAN

Specific to the handling and storage of refrigerant at your business. Visit the audit section of the ARC website for help on creating a RMP.

### ☐ REFRIGERANT RECORDS

Records for refrigerant bought, sold and recovered (bulk amounts).

### ☐ LICENSED STAFF LISTS

A list of all staff at your organisation who hold a current Refrigerant Handling Licence including name and licence number.



Refrigerant handling licence

### ☐ RTA NUMBER

You must display your RTA number on any advertising that promotes refrigeration and air conditioning services, and on any invoices, receipts or quotes for work carried out under the RTA.

*Images used as examples only.*



# Being refrigerant ready – automotive workshops

Auto workshops should be preparing themselves for vehicles containing the new refrigerant R1234yf.

In 2014/15, R1234yf started to be seen pre-charged in some vehicles imported into the country, and available commercially from selected wholesalers. As R1234yf and related equipment becomes readily available in Australia, and more global manufacturers adopt the new refrigerant, the number of R1234yf-equipped vehicles requiring service will increase.

However, these changes will be expected to occur over many years, with R134a continuing to be made available for servicing of existing and older vehicles. R744 is another refrigerant also being used by Mercedes-Benz and Volkswagen Group.

Both new gases and the systems designed for them will present significant changes to the tools, work practices, component standards and workplace safety considerations relating to repair, service and refrigerant recovery. Therefore, it is important that technicians have an understanding of these new refrigerants.



R1234yf and R744 are not listed as scheduled substances under the *Ozone Protection and Synthetic Greenhouse Gas Management Act 1989* (the Act) and therefore are not regulated under Ozone Protection and Synthetic Greenhouse Gas Management Regulations 1995 (the Regulations). Only fluorocarbon-based refrigerants are covered under the Act, Regulations and the ARC licence scheme.

The ARC website will be updated regularly with further information on R1234yf and R744.

## What is BIM and what does it mean for technicians?

Building information modelling (BIM) is an approach to project delivery that uses computed software modelling capabilities to better integrate the design and construction phases. It is based on the idea that a building should be constructed digitally first, using a data-rich three dimensional (3D) model. And then built physically, using the model to better plan, coordinate and execute construction works.

During the design process, software is used to digitally model the physical, spatial and functional characteristics of the building. This includes the structural design, as well as building services such as mechanical, electrical, plumbing and fire protection. As additional elements are added or design changes are made, the model is updated to maintain a single reference point for all parties working on the project. This helps to identify problems during the design phase, minimising reworks and aiding with the coordination of trades onsite.

An important aspect of BIM-enabled construction is the use of digital objects – 3D representations of the individual pieces of plant, equipment and fittings found in a building. For example, the model of a commercial building would contain a detailed 3D model of the plant room, including digital objects that represent the chiller, boiler, pipework and other relevant plant and equipment. These digital objects not only represent the physical dimensions of the plant, but also include parametric data fields relating to its capacity and performance capabilities.

As construction works are completed, the model is also updated to capture other pieces of information that can be useful to those responsible for managing the asset. In the case of a plant room, the digital object representing the chiller can be updated to record the manufacturer's name, model, installation date and refrigerant type. The object can also be updated throughout the asset lifecycle, recording such things as service history or part replacement.

While the adoption of BIM is still in its infancy, service technicians can expect BIM models to become increasingly relevant over coming years – particularly for new buildings. These models have the potential to eradicate much of the guess work that frustrates technicians. However it also presents some challenges, as service businesses will need to invest and upskill in the use and understanding of these models and associated technologies.

*Article courtesy of Air Conditioning and Mechanical Contractors' Association (AMCA).*

