



# COOLCHANGE

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### ARC LEADERSHIP

## Setting the standard for skills

The refrigeration and air conditioning (RAC) licence scheme, run by the ARC on behalf of the Australian government, has never been more popular, with over 84,000 licence holders and still growing.

The RAC licence scheme is the only national licence, regulating the acquisition, possession, disposal and handling of ozone depleting substances and synthetic greenhouse gases in the RAC industry. It is the 'gold star standard' for technicians throughout Australia.

The scheme delivers real value to the industry and has been independently and internationally recognised as world-leading. Perhaps the greatest achievement of the RAC licence scheme is driving the increase in skills within the refrigeration and air conditioning industry.

The higher skill levels within industry has directly delivered improved environmental outcomes, consumer protection and energy efficiency, through better quality services and work practices.

### Environment

RAC-licensed businesses and technicians has contributed to a reduction of 24.37 megatonnes of CO<sub>2</sub>-e direct emissions. Australia's regulations around refrigerants was recently acknowledged as 'world's best' by the US Air Conditioning, Heating and Refrigeration Institute (AHRI).

### Energy efficiency

ARC-licensed technicians – qualified and professional – can lay claim to directly, and positively, impacting energy use in households and buildings. Energy is an important component of our habitation on the planet, but used in excess, can contribute to climate change. By only allowing skilled and qualified people to work with RAC systems, the licence scheme is ensuring systems are installed correctly, running efficiently, and are working longer.

### Consumer protection and safety

The scheme has driven advanced standards in the industry, through a higher skilled workforce. The RAC licencing scheme ensures that technicians are knowledgeable and skilled in understanding environmental standards. It also provides a level of consumer protection, and knowledge of occupational health and safety requirements. The scheme also confirms that technicians are 'fit and proper' for the scope of works for which they are licensed.

# Setting new standards for the industry

As the peak industry body servicing over 84,000 individuals and businesses in the refrigeration and air conditioning (RAC) sector, ARC sits on various committees and groups to ensure the interests of the whole industry are represented.

ARC has representatives on numerous Australian Standards committees, the Refrigeration and Air Conditioning Training Alliance, Government Air Conditioning and Commercial Refrigerants Advisory committee plus many others.

We have also created two industry working groups – training quality and refrigerant evolution – representing the interests of technicians in the sector and providing you with an avenue to have your voice heard.

Our strategy is to update standards within the industry to make them modern and contemporary, so they evolve with the ever changing technological landscape.

To deliver on this objective involves a number of actions, including the work we have done with the ARC industry working groups, as well as our involvement with Standards Australia.

## New standards for refrigerating systems, heat pumps and refrigerants

In October 2016, Standards Australia published the following new standards for the refrigeration and air conditioning sector.

### AS/NZS ISO 817 Refrigerants – Designation and safety classification

ARC had representatives on the committee assessing these significant amendments relating to safety classifications for refrigerants.

We encourage all technicians and businesses to read and understand these changes, and to make sure you and your employees are across the new classifications.

## Roadshow for updated standards – don't miss out

Kicking off in February 2017, ARC Members AIRAH and Standards Australia will present a seminar series on the recently adopted refrigeration safety and environmental standards.

The seminars will provide an introduction and overview to the main changes affecting the HVAC&R industry. The seminars will be presented by Kevin Lee, former Chairman of the ARC and former Chair of Standards Australia technical committee on refrigeration safety requirements.

Brisbane – Tuesday, February 14

Canberra – Wednesday, February 15

Sydney – Thursday, February 16

Hobart – Tuesday, February 21

Melbourne – Wednesday, February 22

Perth – Wednesday, March 1

Adelaide – Thursday, March 2

Visit [www.airah.org.au/seminars](http://www.airah.org.au/seminars) for more information, and to register your interest.

AS/NZS 5149 The following four amendments relate to the safety and environmental requirements of refrigerating systems and heat pumps:

AS/NZS 5149.1 – Refrigerating systems and heat pumps: Safety and environmental requirements – Part 1: Definitions, classification and selection criteria.

AS/NZS 5149.2 – Refrigerating systems and heat pumps: Safety and environmental requirements – Part 2: Design, construction, testing, marking and documentation.

AS/NZS 5149.3 – Refrigerating systems and heat pumps: Safety and environmental requirements – Part 3: Installation site.

AS/NZS 5149.4 – Refrigerating systems and heat pumps: Safety and environmental requirements – Part 4: Operation, maintenance, repair and recovery.

Visit [www.standards.org.au](http://www.standards.org.au) to read more.

## ARC Industry Working Groups Progress

### Refrigerant Evolution Working Group

The industry-led refrigerant evolution working group was established by the ARC in August 2016 to look at issues affecting technicians including: safety, training requirements and technology advances. Its members represent a cross-section of the stationary RAC and automotive air conditioning sector. The group met several times recently and developed a list of the key issues industry felt should be addressed by the group:

Key Issues:

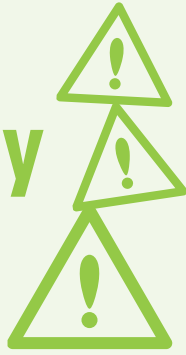
- Adoption of new refrigerants
- Refrigerant identification
- Safe use of flammable and toxic refrigerants
- Transition issues
- Standard of training on new refrigerants.

## ARC summer advertising – building your business

Once again, the ARC will be implementing an online marketing campaign over summer targeted at people looking to buy and service their air conditioners and refrigerators. We use various national online-media outlets to spread the word about using qualified and licensed ARCTick technicians and businesses, including Google, Facebook and a number of high-profile news sites. Our campaigns so far have attracted upwards of 110,000 visitors to the [www.lookforthetick.com.au](http://www.lookforthetick.com.au) website.

Our main goal is to connect potential customers to your businesses through the RTA business directory. Along the way, we educate consumers on the benefits of using licensed technicians and the damaging effects of fluorocarbon refrigerants on the environment.

# Be alert – summer safety warnings for technicians



## Cylinders

ARC Field Officers have observed refrigerant cylinders in the back of open-type vehicles, exposed to direct sunlight. Storing cylinders that are exposed to direct sunlight can lead to pressure levels rising and refrigerant being purged through the safety device and into the atmosphere. Not only is this dangerous, it is bad for the environment and is a breach of the *Ozone Protection and Synthetic Greenhouse Gas Management Act 1989*, and refrigerant handling codes of practice for both stationary and automotive technicians:

### Stationary Code of Practice

14.1.3 Refrigerant cylinders must not be directly heated by flame, radiant heat or uncontrolled direct contact heat, however, warming of the discharging cylinder under controlled conditions to increase the rate of discharge of refrigerant during transfer is permissible.

### Automotive code of practice

A.21.1 Refrigerant containers must be stored in a secure, cool place, away from fire risk and sources of direct heating and must be within test date.

A.21.2 Refrigerant containers must be stored at or below 48°C unless otherwise specified by the manufacturer.

Ensure your cylinders are stored in a safe location, and if they are in a vehicle, make sure they are secured and out of direct sunlight.



## Are your recovery cylinders to standard?

With an increasing number of high pressure refrigerants on the market, it is vital that your recovery cylinders are to standard. Check the required MPa (megapascal) level at which your cylinder should be. MPa is a unit of measuring pressure, and if it exceeds the required standard for the cylinder you own, it creates a risk of pressure build-up, and could result in automatic purging of regulated gas into the atmosphere. This is a safety and environmental risk. If you don't know what the MPa of your recovery cylinder should be, check with the wholesaler you bought the cylinder from.

## Safework NSW issues safety alert for servicing of refrigeration systems

This alert highlights potential risks associated with the servicing of refrigerant systems and has been re-produced by ARC with permission from Worksafe NSW. It applies to all states and territories, so please contact the relevant Worksafe agency in your area if you have any questions.

### Background

A number of serious incidents have resulted in workers being severely burnt when a mixture of refrigerant and compressor oil was expelled and ignited while servicing air conditioning refrigerant systems.

The refrigerant systems contained a non-flammable refrigerant, R22. When mixed with oil, it was ignited by an oxy-acetylene torch used by the workers' to unsweat the copper fittings, while replacing the refrigerant compressor. It's believed residual pressure in the system caused the refrigerant and oil to be released from the pipe joint, which contacted an ignition source and started a flash fire.

### Observations

Oxy-acetylene torches are commonly used to unsweat copper fittings. This plumbing practice can be extremely hazardous and unsafe unless appropriate control measures are taken.

### It should be noted that:

- Refrigerant will remain in solution with compressor oil unless the refrigerant is completely recovered using a reclaim unit. This process may take significant time depending on the size and design of the system.
- Warming or agitating the system will cause the refrigerant to evaporate, resulting in a rise in pressure.
- Attempting to break into a system before all residual refrigerant has been removed can cause a sudden release of refrigerant and oil mist, which will be flammable (it is also unlawful under the Ozone legislation and may incur penalties).
- Heat from a naked flame will likely result in ignition of any expelled refrigerant and oil mist, and can cause trace amounts of refrigerant to decompose and generate highly toxic fumes.

### Action required

Review your current procedures and ensure safe working practices include:

- Reclaiming the refrigerant before breaking into the system
- Ensuring the work area is well ventilated
- Using pipe cutters or similar to cut the pipe.

The use of an oxy-acetylene torch or similar to unsweat pipe joints should only be carried out as a last resort and under very strict and controlled conditions. If oxy-acetylene torch or similar is used, it is recommended that:

- The relevant requirements of the welding processes code of practice and AS 1674.1 Safety in welding and allied processes are complied with
- The system is purged with dry nitrogen following full recovery of the refrigerant
- Adequate ventilation is provided to remove hazardous gases
- Appropriate personal protective equipment and fire protection equipment is used.

Notify Worksafe of any incidents where persons are exposed to a serious risk associated with an uncontrolled fire.

# Cross-contamination: some gasses just don't mix

While the reuse of recovered refrigerant should be encouraged, the use of impure and contaminated refrigerants can result in systems operating inefficiently. This can cause excess power consumption and emissions, increased maintenance costs and ultimately, system failure.

When refrigerant is removed from a system, with a view to reusing it in another system, it needs to be tested and cleaned in accordance with Australian Standards ARI 700-2004.

Impure refrigerants can, at worst, cause damage to equipment and, at best, result in lower product energy efficiency, driving up costs. It is critical that cylinders are clearly marked with the type of refrigerant they hold, so that cross-contamination is prevented.

Different refrigerants require different cylinders. For example, some flammable refrigerant cylinders require the cylinder to be reclassified and handled as a flammable compressed gas – like LPG.

To avoid the risk of mixing refrigerants:

- Ensure correct labelling of refrigerant type in systems
- Identify refrigerant type in systems prior to recovery
- Ensure you have the correct type of cylinder and it is labelled with the refrigerant type.

## Tamper-evident straps

The use of tamper-evident straps is one way to deter, and identify, cross-contamination of refrigerants. These straps can be fastened to the access valve on the cylinder or the pipework. They don't stop someone from accessing the valve, but they do highlight if the integrity of the system has been tampered with.

## Correct labelling

No labelling on cylinders and systems creates severe risks for technicians. If new labels are not fitted when refrigerant changes are made it creates serious hazards for the next technician who comes along to work on the system. Correct labelling is critical for the safety of technicians and if you are aware of anyone not properly labelling systems you should report them to ARC.

[www.arctick.org/breach\\_law](http://www.arctick.org/breach_law)

## GENERAL NEWS

# CO<sub>2</sub> is driving cool in Europe

Although R1234yf is well on the way to replacing R134a as industry standard automotive AC refrigerant in new cars, an alternative is already emerging in European luxury cars.

R744 is pure carbon dioxide. It is naturally occurring, inexpensive and non-flammable. Its use as a vapour-compression refrigerant dates back to the 1860s, when it was first used for chilling meat on ships.

The first production vehicle to use R744 is the Mercedes-Benz S400 Coupe and it will be rolled out across the S-Class and E-Class ranges. Most German car brands, including Audi and Porsche, are working on R744 systems.

Whether R744 will be used in cars sold outside Europe remains to be seen, but SAE International this year re-opened a dated set of standards relating to vehicles using this refrigerant.

Questions remain over R744's performance in Australia's hot summer conditions, but during a recent auto-AC conference in Frankfurt a representative of component manufacturer Valeo told Vehicle Air Conditioning Specialists of Australia (VASA) that Australians will appreciate the quicker cool-down times compared with R1234yf. Some tests have also shown R744 systems to have lower impact on fuel consumption than those using R134a.

Just as the A2L mild flammability rating of R1234yf brings new handling and safety considerations, the extreme operating pressures of R744 and hazards associated with potentially high concentrations of CO<sub>2</sub> in vehicle cabins or working environments mean this refrigerant must also be used with care. For example, R744 systems can operate at up to 170 bar (2466 psi) and trapped liquid CO<sub>2</sub> in hoses can cause pressure explosions if exposure to higher temperatures causes a phase change. Dry ice can also form, which can burn skin and block parts of the system for long periods of time until it has evaporated.



Understandably, R744 systems and service equipment must be extra robust compared with those for R1234yf and R134a. The reason R744 is debuting in high-end luxury cars is to help absorb the cost of those engineering challenges.

R744 service equipment, which vents used refrigerant to atmosphere, has integrated fans to disperse the gas. If CO<sub>2</sub> concentrations in the air become unsafe, built-in sensors shutdown the process and alert the technician.

Vehicles using R744 have cabin air quality sensors that detect refrigerant leaks and let in fresh air if CO<sub>2</sub> concentrations exceed 800 parts per million (average atmospheric levels are below 400ppm).

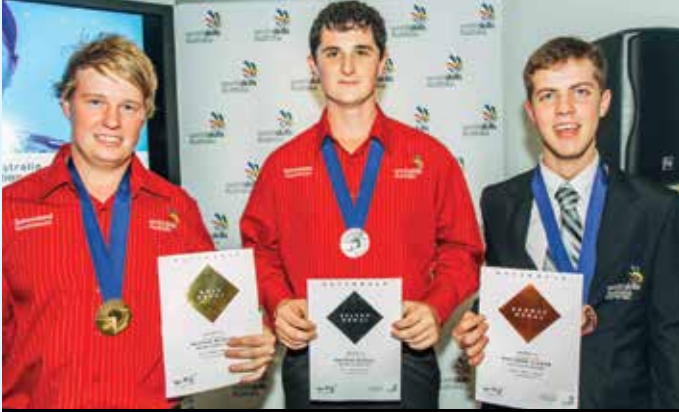
Symptoms from over-exposure to CO<sub>2</sub> range from drowsiness to, in extreme cases, death. But as with R1234yf, the right training, equipment and attitude will ensure safe use of R744.

Article courtesy of ARC member association VASA.

# Fridgies of the future

The WorldSkills Australia National Competition was held from 6-8 October at Melbourne Showgrounds with the support of the Victorian Government.

The event was the culmination of months of training for over 500 competitors from across Australia who earned their spot in Melbourne after achieving success at the regional level in 2015. Competitors were aged between 16-24 years and represented over 60 trades and skills.



From L to R: Nathan McHugh (GOLD), DTM Air Services & TAFE QLD Skills Tech; Hayden McColl (SILVER), Refrigeration House of Queensland & TAFE QLD SkillsTech; Matthew Cleave (BRONZE), Commercial Air Mechanical Services & TAFE NSW South Western Sydney Institute

Entrants spent a total of 16-20 hours across three days completing projects aligned with National Training Packages. WorldSkills was overseen by 300 judges and assisted by 120 dedicated volunteers who act as judges, team leaders and mentors, assisting with everything from providing essential materials and equipment, to answering queries and giving tours throughout the three days of competition.

The refrigeration and air conditioning component of WorldSkills had already taken place at ARBS where it is afforded its own showcase at the expo. At the October event, the RAC winners from ARBS – Nathan, Hayden and Matthew - did a demonstration of their ARB's winning projects, with gold medallist Nathan gearing up for his stint at the international WorldSkills competition being held in Abu Dhabi in 14-19 October 2017.

## ARC MANAGER RECOGNISED AT WORLDSKILLS

At a VIP function at the end of the competition, WorldSkills CEO, Brett Judd presented Noel Munkman, ARC Technical and Training Manager, with one of the first 20 Life Memberships ever to be awarded to WorldSkills volunteers. Life Memberships are awarded to those who have made a significant difference to the WorldSkills event over a long period. Noel has been involved in regional, national and international WorldSkills competitions since 1989 as a refrigeration judge, chief judge, team leader and assistant technical delegate.

# Kigali HFC phase-down agreement reached – coming in from the cold

On the 15th of October this year, countries from around the world agreed to phase-down HFC production and imports under the Montreal Protocol on Substances that Deplete the Ozone Layer.

Proposals to phase-down HFCs under the Protocol had been made since 2009, but it was only in 2015 that countries decided to move ahead with negotiating an agreement. Negotiations on the shape of the agreement took place over several meetings in 2016, culminating with the meeting in Kigali in October.

The agreement means that Australia and other developed countries, will need to cut HFC bulk imports by 10% in 2019, leading to a 85% reduction in 2036. Most developing countries (including China) will freeze their HFC imports and production in 2024 and start their reduction steps in 2029.

The international agreement follows on from the domestic review of the *Ozone Protection and Synthetic Greenhouse Gas Management Act 1989*. As a result of the review, the Australian Government announced an HFC phase-down starting in 2018. The international agreement complements the domestic HFC phase-down and means that all countries will be phasing out imports and production of HFCs.

Recent technology advances suggest that reducing our reliance on HFCs will not be as hard as it sounds. For motor vehicle air conditioning, HFO-1234yf or carbon dioxide systems are already available and being imported into Australia. In Australia, this sector is the major user of



Small group consultations on the last day of negotiations around the Indian delegation with the USA, Australia, China and EU delegates.

HFCs (HFC-134a). In domestic split air conditioning systems, R32 (with a Global Warming Potential (GWP) of 680) is already replacing the much higher GWP R-410A. With these two changes, and lower GWP blends on the horizon, we expect that meeting our requirements under the new agreement will be relatively smooth.

The next steps for the Australian Government are to introduce legislation in 2017 giving effect to a domestic phase-down of HFCs (ie establishing industry limits on a per year basis and developing a quota system for importers) and then to ratify the amendment to the Montreal Protocol shortly thereafter. Ratification of a treaty (or an amendment to a treaty) involves a number of steps including undertaking a National Interest Analysis and a Regulatory Impact Statement.

The Australian Government has supported an HFC phase-down under the Montreal Protocol for a number of years now, given the environmental benefit of such an approach, the expertise of the Montreal Protocol institutions which are well placed to phase-down HFCs, much as it has phased-out HCFCs and CFCs, and the development of new lower GWP and more energy efficient technologies. Australian industry and government officials were prominently involved in agreeing the final outcome.

For further information, see [www.environment.gov.au/protection/ozone/montreal-protocol/international-hfc-phase-down](http://www.environment.gov.au/protection/ozone/montreal-protocol/international-hfc-phase-down)

# Annual indexation to application fees for refrigeration and air conditioning (RAC) Licences

Under the Ozone Protection and Synthetic Greenhouse Gas Management Regulations (1995), Regulation 346 provides for the annual indexation of permit application fees.

The annual indexation formula uses the Wage Price Index (WPI) figures, published by the Australian Bureau of Statistics. Due to the WPI figures released this year, RAC licence application fees will increase by 1.96% from 1 January 2017.

The table shown lists the 2016 application fees and the new application fees from 1 January 2017. For further information about the changes to permit fees, visit the Department of the Environment and Energy's website at [www.environment.gov.au](http://www.environment.gov.au)

RAC Industry Permit	Current fee (2016)	Application fee from 1 January 2017
Refrigerant handling licence (2 years)	\$140	\$143
Restricted refrigerant handling licence (1 year)	\$71	\$72
Trainee refrigerant handling licence (1 year)	\$29	\$30
Refrigerant trading authorisation (1 year)	\$226	\$230
Refrigerant trading authorisation (2 years)	\$452	\$461
Restricted refrigerant trading authorisation (2 years)	\$140	\$143

## Illegal discharge of Refrigerant

*Ozone Protection and Synthetic Greenhouse Gas Management Act 1989 /*  
Ozone Protection and Synthetic Greenhouse Gas Management Regulations 1995

**Did you know that discharging refrigerant containing ozone depleting substances and synthetic greenhouse gases is an offence under the Ozone Protection and Synthetic Greenhouse Gas Management Act 1989?**

### It makes sense to handle refrigerant correctly

Preventing discharges from occurring is good for the environment, it also makes financial sense as recovering refrigerant and returning it to a wholesaler earns credit for each kilo returned. Refrigerant Reclaim Australia has more than 500 collection points across Australia.

### Discharging refrigerant to the atmosphere

A discharge of refrigerant is illegal whether it is done deliberately or accidentally. This is why it is important to ensure you are following codes of practice, working to the required Australian Standard and meeting the conditions of your refrigerant trading authorisation when handling refrigerant.

It is an offence under section 45B of the *Ozone Protection and Synthetic Greenhouse Gas Management Act 1989* to carry out an action which results in a discharge of a scheduled substance.

Penalties for a body corporate may be up to \$270,000 and \$54,000 for an individual.

### Compliance and enforcement

The Department of the Environment and Energy is focussing its work on detecting and responding to instances where:

- work on refrigeration and air conditioning equipment results in the illegal discharge of refrigerant; and
- refrigerant is being handled by someone without an appropriate permit.

The Department works closely with the Australian Refrigeration Council to provide information and assist technicians in the refrigeration and air conditioning industry to prevent discharges from occurring.

If you have any information about the discharge of a scheduled substance, or other non-compliance within the refrigeration and air conditioning industry, you can report it to the Australian Refrigeration Council by lodging a complaint at [www.arctick.org/information/lodge-a-complaint/](http://www.arctick.org/information/lodge-a-complaint/)

Information is held in strict confidence. If you would like more information about the scheme, including how to obtain a licence, contact ARC on 1300 88 44 83.