Newsletter for the Refrigeration and Air Conditioning Industry

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COOLCHANGE

In this issue

Summer success

The ARC summer advertising campaign is all about promoting and driving consumers to use ARC licensed technicians.

The results have been fantastic for authorised businesses and licence holders alike, with almost 100,000 people visiting the RTA directory website between Nov 2016 and Feb 2017.

Using a number of cost-effective marketing strategies including: search engine marketing, online advertising, Google AdWords and Facebook advertising, the ARC achieved results in the following areas:

- **Visits to www.lookforthetick.com.au –** visitors to this website can learn about the importance of using licensed technicians and find authorised businesses nearest to them.
- **Use of the RTA directory –** actual proof that ARC advertising is driving customers to responsible businesses.
- **Licence check facility –** for potential customers to check the status and type of licence a technician holds.
- **Downloads of information guides –** used by people looking to buy air conditioners/refrigerators or get their systems serviced. Provides helpful tips on what to look for, and the importance of checking the technician has the right licence type.

Improving consumer knowledge and providing pathways to connect with licensed businesses is good for the environment and good for business.

Results	2016/17	Improvement on last summer
Visits to www.lookforthetick.com.au	93,514	+ 205%
Use of the RTA business directory	7,772	+ 198%
Use of the ARCTick Licence check	1,560	+ 3%
Downloads of ARCTick info Guides	2,660	+ 186%

Dry nitrogen – the forgotten gas
> read more inside

Driving auto gas education

The Australian Government has given the green light to an Australian Refrigeration Council (ARC) proposal to deliver an education campaign across the automotive industry to increase awareness about current and emerging refrigerants.

"The ARC Board initiated a proposal to the Department of the Environment and Energy recommending the need for more education on emerging refrigerants in the auto industry, and we are delighted the Department will provide funding for this much needed project," said ARC Chairperson Kevin O'Shea.

With the refrigeration and air conditioning industry transitioning to new refrigerant types, knowledge and information are paramount to ensure the efficient, safe and effective use of refrigerants.

The ARC campaign will include: development and distribution of educational wall charts and packs for workshops, and a dedicated page on the ARC website, including materials to help industry better understand the refrigerants they are working with now, and in the future.

"Starting off in Victoria, this project will help the automotive industry prepare for emerging, low global warming potential refrigerant gasses and educate on the importance of minimising the release of regulated refrigerants into the environment. We look forward to consulting with ARC members in the automotive field to make the information as targeted and relevant as possible," Mr O'Shea said.

Certificate II under review

The Australian Refrigeration Council (ARC) Board has initiated a review of the competencies associated with the Certificate II qualification to confirm that they remain relevant to the restricted heat pump – split systems – installation and decommissioning licence.

The review of the Certificate II level training is being undertaken through the ARC's 'Training Quality' industry working group, under the guidance of ARC's Technical and Training Manager Noel Munkman.

Kevin O'Shea, the Chairperson of the ARC Board said, "The review will identify if the training competencies still meet the requirements of the scope of works permitted by the restricted licence."

"The dynamic nature of the industry means qualifications which underpin licence types must remain relevant and appropriate," Mr O'Shea said.

The requirement for the Certificate II qualification is set out in the Ozone Protection and Synthetic Greenhouse Gas Management Regulations 1995. Results of the review will be presented to the Australian Government for their consideration.

A reminder for restricted licence holders

It is critical that holders of restricted licences through the ARC do not work beyond the scope of works permitted on the licence.

It is an offence to handle refrigeration and air conditioning equipment without an appropriate refrigerant handling licence and a penalty of up to $1,800 may apply. Working outside the scope of a licence could also result in the cancellation or suspension of a licence.

"The ARCTick licence scheme is a qualifications-based scheme. Licensed technicians prove their competency to perform services when applying for a licence. A person with a 'split system installation' licence, for example, provides a Certificate II level qualification, so they are limited in the work they can do. The Ozone regulations state this is the minimum requirement to demonstrate their abilities to perform installations of split systems up to 18 Kw," said ARC CEO Glenn Evans.

"Where a Certificate II level technician has not demonstrated their ability to perform repairs, servicing or maintenance on systems there is a risk refrigerant may be emitted. A Certificate III level licence holder, for example, has demonstrated their abilities to perform those services – and that's what their licence entitles them to do."

The Australian Refrigeration Council (ARC) has recently communicated with all restricted 'split system installation' licence holders Australia-wide to remind them of the limitations of the entitlements of their licence, and the work they can and can't do.

Industry careers video – investing in the future

The Australian Refrigeration Council (ARC) has released a new video which highlights the refrigeration and air conditioning (RAC) industry, promoting it as a career of first choice.

The RAC industry plays a very important role in today's society, deserving to be presented as dynamic, prosperous and vital, with many exciting and diverse opportunities. The industry warrants its own widely recognised profile in the community," said Kevin O'Shea, Chairperson of the ARC. "Without RAC technicians surgery cannot be performed, nor can food be kept fresh. The welfare and comfort of society is directly affected by refrigeration and air conditioning," Mr O'Shea said.

The RAC industry is constantly using modern technologies to achieve energy efficiency and environmental benefits. The sector is at the cutting edge in energy efficiency and environmental stewardship.

We have led the world for over 10 years by demonstrating Australia's commitment to environmental best practice through the RAC sector.

"All this leads to a vast array of potential career opportunities. This video is all about getting prospective students excited about the trade. We are currently distributing the video to career counsellors in secondary schools and encourage all people in the RAC industry to spread the word – let's get young people excited about our trade," Mr O'Shea said.

This video is just one example of the initiatives the ARC is investing in for the industry and those who use refrigeration and air conditioning services. Visit **www.arcltd.org.au/careers** to view the video.

WorkSafe VIC Safety Alert – Safe use of flammable refrigerants

This safety alert concerns Class 2.1 Flammable refrigerant gases and provides guidance to occupiers of premises on how to control the risk of fire and explosion from refrigeration and air-conditioning systems containing flammable refrigerants. It has been reproduced by ARC with permission from WorkSafe VIC.

Background

The extensive environmental damage caused by synthetic chemical refrigerants has given rise to the use of natural refrigerants, predominantly hydrocarbons, carbon dioxide and ammonia. Many of these refrigerants are flammable, toxic or both and have the potential to cause serious injury or death as well as property damage. A recent incident involving flammable refrigerants resulted in death, injury and damage to property. When hydrocarbon refrigerants containing mercaptan odourant are used in a refrigeration or air-conditioning system fitted with a filter-dryer, the mercaptan may be removed from the refrigerant during operation, meaning that if the refrigerant leaks out, it may not smell and the leak may be undetectable.

Duties

Occupiers of premises must identify all hazards and use appropriate risk controls to comply with the *Dangerous Goods Act 1985* and the Dangerous Goods (Storage and Handling) Regulations 2012 (Regulations).

Under the Regulations occupiers must obtain material safety data sheets (MSDS) or safety data sheets (SDS) from the supplier of the refrigerant. Occupiers of premises should ensure personnel adhere to the safety requirements set out in the MSDS/SDS.

Marking and labelling

Service access points, refrigeration systems and entries into machinery rooms that contain flammable refrigerants need to be marked and labelled with warning signs that such systems contain class 2.1 flammable refrigerants.

For further guidance, refer to *AS/NZ 5149 Refrigerating systems and heat pumps – Safety and environmental requirements and the Code of Practice for the Storage and Handing of Dangerous Goods.* Flammable refrigerants in gas cylinders should be clearly marked with one of the Class 2.1 flammable gas labels:

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Location of equipment containing flammable refrigerants

Refrigeration and air-conditioning equipment should be located outdoors and above ground in a well ventilated area. Locating these in enclosed spaces or below ground should be avoided. Where this is unavoidable, additional risk controls should be used to prevent the dangerous accumulation of leaked refrigerant in any space.

Where a refrigeration or air-conditioning system must be located within the confines of, or ducted into, a building or enclosed space, the quantity of flammable refrigerant in the system should be limited so that if it leaked into the space, it would not create a concentration in air above 20% of lower flammable limit (LFL).

Flammable refrigerant charge

Refrigerant	Charge Limit g/m³ of Net Room Volume[1] (based on 20% LFL)	Max allowable charge per system located in the enclosed space (kg)	Can the Charge limit in either column be exceeded if control measures are used?
R290	7.6	1.50	No
R600a	8.6	1.50	No
R1270	9.2	1.50	No
R32	61.4	11.97	Yes
R143a	56.4	11.00	Yes
R1234yf	57.8	11.27	Yes
R1234ze(E)	60.6	11.82	Yes
R142b	65.8	12.83	No
R152a	26.0	5.07	No

Flammable refrigerants should only be used to replace non-flammable refrigerants in existing refrigeration or air-conditioning systems when the system and components have been assessed as suitable to operate with the flammable refrigerant.

Manufacturers can advise whether refrigeration or air-conditioning systems are suitable for conversion from non-flammable to flammable refrigerants.

Alternatively, an engineering assessment can be undertaken to ensure that the system is suitable to be converted for use with flammable refrigerant. Such an assessment should be undertaken by a qualified and experienced engineer, for example, one registered on the National Engineers Register or an equivalent recognised body.

Air conditioning equipment using flammable refrigerants should use a flammable gas detector alarm system for the air leaving the cooling coil.

Risk Control Measures

If the quantity of refrigerant in one independent/separate refrigeration or air-conditioning system is such that it would create a concentration in air above 20% of the LFL and the refrigerant has a 'yes' beside it in the control measures column in the table above, additional control measures should be put in place to reduce the risk of fire and explosion.

Suggested risk controls include:

1. The use of suitably located flammable gas detectors inside the space being air-conditioned. Gas detectors should be alarmed and interlocked to ensure a failsafe isolation shutdown of the air-conditioning system, in the event of a flammable gas leak.
2. Where refrigeration equipment is located within the confines of a building, the use of floor level flammable gas detectors interlocked with a floor level mechanical extraction system, with an alarm that will activate once a gas leak is detected. The detection and extraction system should be at floor level because most flammable refrigerants are heavier than air. If no gas detectors are installed the mechanical extraction system should operate continuously.
3. Elimination of ignition sources where possible.
4. Emergency procedures in the event of a leak.
5. Keeping records of maintenance and repair to the equipment, including date, contractor's details and other relevant information.
6. Refrigeration engineers, technicians, service persons and emergency responders must be vigilant as to the hazards associated with flammable refrigerants, including the need to use appropriate gas detection equipment. Where there is uncertainty as to what the system is charged with, proceed with extreme caution and identify the refrigerant, by testing if necessary, prior to engaging with the system.

[1] *Net room volume means the gross room volume less the volume of any product, equipment, or objects located in the room.*

Further Information

AS/NZS 5149 Refrigerating systems and heat pumps – Safety and environmental requirements
Code of practice for the storage and handling of dangerous goods, WorkSafe, 2013

Dry nitrogen – the forgotten gas

Dry Nitrogen is the only inert gas that should be used during the installation and pressure testing of refrigeration and air conditioning (RAC) equipment and pipework. It is a clean, non-flammable, non-toxic, non-reactive and stable gas which absorbs moisture and can prevent oxidisation inside pipework during brazing.

A pressure test and inspection prior to evacuation is required for all RAC piping systems. To ensure a leak free system, this should be performed, without exception, at the time of installation, or after a system service where the sealed system has been breached.

Using dry nitrogen during installation and pressure testing of RAC systems helps minimise oxidisation internally and reduces moisture entering the system through physical leaks during evacuation. Clean, leak-free systems are imperative to ensure proper moisture removal during evacuation.

Extreme caution must be exercised when using dry nitrogen, as the cylinder pressure at room temperature may be as high as 14,000 kPa, and all necessary personal protective equipment must be worn.

The use of dry nitrogen during installation must follow the Australian and New Zealand Refrigerant Handling Code of Practice 2007, Part 2 including clauses:

- 5.25 After pipework has been fixed in position, dry nitrogen **must** be passed through the system to remove oxygen prior to brazing or silver soldering joints.
- 5.26 Dry nitrogen **must** be bled continuously through the system during the brazing operation to eliminate oxidation (scaling), a common cause of choked dryers, blocked expansion valve strainers, dirty oil and compressor failure.
- 5.27 The nitrogen **must** be at minimal gauge pressure during the brazing operation to eliminate the possibility of pin hole leaks

The use of dry nitrogen during pressure testing must be in accordance with equipment manufacturers' specifications and Australian Standard AS/NZS 5149.2:2016:

- Clause 5.2.2 Pressure requirements, to determine the maximum allowable pressure (PS). The maximum allowable pressure varies depending on the design, ambient conditions and systems conditions. For example, with air-cooled equipment with a design ambient temperature of 43ºC:
  - The maximum allowable high side pressure of the system is the equivalent vapour pressure of the system's refrigerant at 63ºC, for example R134a = 1,690 kPa, R410a = 3,975 kPa.
  - Low side of the system to the equivalent vapour of the system's refrigerant at 43ºC, for example R134a = 1,000 kPa, R410a = 2,520 kPa.
- **Leak testing** must follow Clause 5.3.3.3 Site Test. All sections of the system constructed on the installation site shall be tightness-tested before the plant is charged with refrigerant. The site test procedure and acceptance criteria shall conform to the requirements of Clause 5.3.3.1 and 5.3.3.2. Elements that have already been tightness-tested and that can be safely isolated from the site test need not be re-tested.

Australian and New Zealand Refrigerant Handling Code of Practice 2007, Part 2 includes the following clauses:

- 5.31 The system **must** be pressurised to a safe test pressure, having ensured there are no gross leaks as per 5.29 and 5.30.
- 5.33 The system **must** be observed over a period of time, relative to the size of the system, to ensure that no pressure drop occurs, having due regard to temperature variation throughout the system.
- 8.10 If work has been done on the refrigeration circuit, the system **must** be leak tested after service and any identified leaks must be repaired. Refrigerant must not be put into the system for the purpose of leak testing.
- 8.12 The low pressure side of a system **must** be placed under a positive pressure before leak testing the evaporator, heat exchanger, expansion valve, solenoid valve, and other components.
- 8.13 Pressure build up in the low pressure side of the system **must not** exceed the maximum design conditions during servicing.

The Australian Automotive Code of Practice 2008 includes the following clauses:

- A.19 Leak detection – preparation for electronic leak detection: Prior to leak testing, a refrigerant identification check should be carried out if the refrigerant composition is unknown. This is to minimise the risk associated with the use of electronic leak detectors that use an electrical discharge across the tip in the presence of hydrocarbon refrigerants.
- A.19.1 To overcome the practice of topping up the system with a coloured dye and asking the owner/driver to drive the car for a few days, the following notes should apply:
  - Suitable leak detection equipment must be used in the detection of refrigerant leaks. The equipment can be electronic, visual or pressure leak detection.
  - Irrespective of the type of leak detection equipment used, the equipment must be used in accordance with the equipment manufacturers and or supplier's operating instructions and maintained accordingly.
  - If Refrigerant Handling Licence holders use dry nitrogen test equipment to detect leaks, reference must be made to the vehicle manufacturer's service guidelines.
- A.19.2 The use of ultraviolet dye as a diagnostic tool to detect leaks is acceptable if all other available means of leak detection have failed and the technician still suspects the presence of a leak. Adding dye to a system **must not** be used as a diagnostic tool of the first resort.
- A.19.3 A technician that proposes to use ultraviolet dye as a diagnostic tool to detect leaks **must** have documented all other efforts made to detect the leak.
- A.19.4 Technicians **must** refer to the manufacturer's specifications to ensure that the use of dye does not impinge on the warranty or future serviceability of the system.

The technician should start at a lower test pressure and gradually work up to the final pressure. For example, start at approximately 300 kPa and let the system rest for several minutes to equalise before observing the pressure and listen for leaks. If the pressure is not dropping, continue to pressurise the system at increments of approximately 300 kPa until the desired test pressure is reached. Once the pressure is equalised, the technician should audibly check the system at each joint for leaks and, provided none are found, commence the following test procedures:

1. Pressure Leak test – check all pipework joints for leaks using a soap-water solution.
2. Standing Pressure test – allow the system to stand with the test pressure for a period of time and record any change in pressure. A drop in the pressure can be caused by a leak which must be found and repaired. The longer it sits without a drop in pressure, the more confident the technician can be that the system is leak-free which prevents fluorocarbon refrigerant emissions to the atmosphere. A drop in the pressure can be caused by a:
- Leak which must be found and/or
- Drop in the ambient temperature.

ARC MEMBER PROFILE

As their name suggests, Refrigerants Australia (RA) is the peak organisation representing many of Australia's refrigerant importers and suppliers.

RA covers all refrigerants – synthetic and natural – and includes a whole-of-industry membership from importers to technician organisations.

RA was one of the driving forces behind the current national refrigerant-based ARCTick licence scheme. Back in 2005 RA, along with a pro-active group of industry bodies and the Australian Government, acknowledged and acted on the harmful effects ozone depleting refrigerants have on the environment. This led to the qualifications-based ARC licence, and had the dual effect of upskilling the industry, as well as reducing emissions of harmful refrigerants into the atmosphere.

To read more about Refrigerants Australia and the work that they do visit **www.refrigerantsaustralia.org**

REFRIGERANTS AUSTRALIA

auto-AC future:gas ROADSHOW

National refrigerant safety and awareness seminars 2017

These mid-week evening sessions will provide focussed background information and details on how your work will need to change as a result of new HFO and natural refrigerants entering the market.

In addition to the refrigerants themselves, the seminars will explain in what equipment they will be used, what the issues are with their use and what is needed to manage these effectively. These seminars have been organised and supported by prominent mainstream industry associations Refrigerants Australia, Refrigerant Reclaim Australia, the Refrigeration and Air Conditioning Contractors Association, the Air Conditioning and Mechanical Contractors Association and the Australian Refrigeration Council.

Locations and dates:

Newcastle NSW: Tuesday June 20
Sydney NSW: Wednesday June 21
Canberra ACT: Thursday June 23
Townsville QLD: Tuesday July 18
Brisbane QLD: Wednesday July 19
Rockhampton QLD: Thursday July 20
Adelaide SA: Tuesday August 1
Perth WA: Wednesday August 2
Darwin NT: Thursday August 3
Melbourne VIC: Tuesday September 5
Hobart TAS: Wednesday September 6
Albury NSW: Thursday September 7

Visit **www.futuregas.ac** for further information.

Suspension and cancellations of RTAs

The Department of the Environment and Energy (DoEE) is currently considering the suspension or cancellation of a number of Refrigerant Trading Authorisations (RTA) referred for compliance action by the Australian Refrigeration Council (ARC).

Holders of RTAs that have been subject to a permit condition check (audit) by the ARC will understand the importance of resolving any noncompliance issues as soon as possible. Failure to do so can result in a referral to the DoEE for escalated compliance action. This can include a site inspection of your business premises and records by authorised inspectors under the *Ozone Protection and Synthetic Greenhouse Gas Management Act 1989*. Compliance actions can also include official warnings, suspension/cancellation of licences, injunctions and in some cases prosecution. Since 1 July 2016, more than 130 RTA holders have been referred to the DoEE for compliance action. Approximately 20 of these have failed to rectify their compliance issues and are now being considered for RTA suspension/ cancellation. Suspension or cancellation of an RTA can have a big impact on your ability to do business:

- You would no longer be permitted to acquire, possess or dispose of bulk refrigerant. Continuing to do so during a period of suspension or after cancellation of a permit is a criminal offence.
- Your application for new or renewed licences or permits may be refused.
- You may be subject to additional compliance monitoring requirements, if a RTA is granted in future.

In order to avoid suspension of your RTA, keep your records and equipment in accordance with your RTA conditions and deal with any non-compliance matters in a timely manner.

To find out what conditions you must comply with visit **www.environment.gov.au/protection/ozone/legislation**. To find out more about ARC permit condition checks visit **www.arctick.org/business-authorisation/auditing/** or contact **1300 884 483**. Information on the DoEE ozone compliance and enforcement program can be found at **www.environment.gov.au/protection/ozone/rac/compliance**