R32 Refrigerant Information Guide

For technicians

Australian Government
Department of Agriculture, Water and the Environment

ARC™

Inside

This information guide is produced by the Australian Refrigeration Council (ARC) and the Department of Agriculture, Water and the Environment to help refrigeration and air conditioning industry permit holders better understand the characteristics, equipment, regulations and safety considerations for R32 refrigerant.

Note: This information has been provided as a guide only. For more detailed and authoritative information on R32 refrigerant, please refer to the relevant Australian Standards, work health and safety regulations and relevant material safety data sheets available from refrigerant wholesalers.

Overview

R32 refrigerant is a lower global warming potential (GWP) alternative to R410A commonly used in new air conditioning systems.

Globally, small air conditioning systems are rapidly transitioning from R410A to R32. In 2019, R32 systems (small, pre-charged) made up 71 per cent of the market, an increase from 52 per cent in 2018 and up from effectively zero in 2013.

As manufacturers gain experience with R32, there is a general trend for it to be used with larger charge sizes. It is predicted that we will increasingly see the introduction of R32 in larger ducted systems over the next few years.

A refrigerant handling licence is required when using R32 refrigerant, and a refrigerant trading authorisation is required to acquire, possess and dispose/sell it.

R32 refrigerant, and the systems designed for it, present significant changes to the service tools, working practices, component standards and workplace safety considerations relating to install, repair, service and refrigerant recovery.

R32 – KEY POINTS
Lower flammability with a safety classification of A2L
High operating pressure
Dangerous Goods Class 2.1 flammable gas
Only use equipment rated for use with A2 and A2L refrigerants
Suitable trade training in flammable refrigerants is recommended

Properties and characteristics

Table 1: Comparisons between R32 and R410A

PROPERTIES	R32	R410A
Boiling point	-51.7°C	-51.0°C
Critical temperature	78.4°C	72.0°C
Saturation pressure at 4°C	818kPa	806kPa
Saturation pressure at 40°C	2380kPa	2337kPa
Global warming potential	675	2088
Flammability rating	A2L lower flammability	A1 non-flame propagation

Note: R32 systems tend to have a smaller charge size than R410A. The effective reduction in GWP is about 75 per cent.

Table 2: Safety groups as determined by flammability and toxicity (AS/NZS ISO 817)

FLAMMABILITY CLASS	SAFETY GROUP	
Higher flammability	A3	B3
Flammable	A2	B2
R32 Lower flammability	A2L	B2L
No flame propagation	A1	B1
	Lower Toxicity	**Higher Toxicity**

Table 3: Characteristics

CHARACTERISTICS
Non-toxic
Hydrofluorocarbon (HFC) gas
Oil: POE (Poly Olester Oil)
Non-ozone depleting

Do I need a permit through the ARC to handle and buy R32?

Yes. R32 is controlled under Australia's Ozone Protection and Synthetic Greenhouse Gas Management legislation.

A refrigerant handling licence (RHL) is required to work on systems containing R32. A refrigerant trading authorisation (RTA) is required to acquire, possess and dispose of R32.

Although R32 has a lower global warming potential compared to other common refrigerants, it is still mandatory to recover this refrigerant from end of life air conditioning and refrigeration systems or during maintenance on the refrigeration circuit. Changes to the Dangerous Goods Legislation, effective in 2021, has new categories for A2L refrigerants.

R32 is a synthetic greenhouse gas. If released to the atmosphere it can contribute to climate change.

R32 is a flammable refrigerant. Regardless of the licensing provisions, employers have a duty of care to ensure that their workers are appropriately trained and have the necessary equipment to use A2L refrigerants.

For additional occupational and work health and safety licensing requirements, check with the relevant state-based licensing authorities.

Safety issues to be aware of when handling R32

Australian Standard AS/NZS ISO 817:2016 classifies R32 as A2L lower flammability. Technicians need to take the relevant safety measures for the correct transport, storage and handling of a flammable gas.

This includes ensuring that the gas is not exposed to open flames or other ignition sources. Toxic substances like hydrogen fluoride and carbon dioxide are created when R32, like all fluorinated refrigerants, is burnt. Asphyxiation and freeze burns are also a risk.

For transportation purposes, R32 is classified as a dangerous goods class 2.1 flammable gas under the Australian Dangerous Goods Code and therefore requires additional handling and storage safeguards compared to class 2.2 non-flammable gases.

Safety issues to be aware of:

- For installation of split system air conditioners concentration levels are important, especially with ducted systems. The smallest unventilated room the system serves dictates the maximum refrigerant charge that can be safely installed.
- Ducted indoor units pose an additional hazard because the indoor unit is generally in a confined space with only a small amount of room between the indoor unit and the rafters. If a gas leak occurs within the indoor unit the refrigerant can pool and become trapped, reaching flammable concentration levels.
- Dry nitrogen should always be used when brazing to displace the oxygen and prevent oxidisation on the inside of the pipework. This procedure is important as it is also required to displace the residual refrigerant and prevent concentration levels conducive to ignition.

Further information

Manufacturers and suppliers are required to include additional safety information in the installation and service manuals for air conditioners using a flammable refrigerant. Technicians should follow these instructions.

The Flammable Refrigerants Safety Guide developed by the Australian Institute of Refrigeration, Air Conditioning and Heating outlines the occupational health and safety risks associated with refrigeration and air conditioning equipment and systems that use flammable refrigerants. Module 8 covers cylinder handling, storage and transport. See the 'More information' section for details on how to access this guide. Please refer to the updated 2018 edition.

Check with the relevant state-based WorkSafe agencies and refer to the relevant material safety data sheets available from refrigerant wholesalers for specific safeguards when handling R32.

What equipment do I need to handle R32?

Only use equipment rated for use with (A2L or A2) flammable refrigerants. Personal protective equipment should always be worn when handling R32 or any other refrigerant. Due to the flammability and high operating pressures of R32, existing equipment (e.g. manifolds, gauges, vacuum pumps, recovery units) must be checked for compatibility. Any potential sources of ignition from electrical equipment must be eliminated.

EQUIPMENT GUIDE	
R32 calibrated gauge manifold set	
Electronic refrigerant detector, rated for use with (A2L) flammable refrigerants.	

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EQUIPMENT GUIDE

Vacuum pump rated for use with (A2L or A2) flammable refrigerants

Recovery/reclamation equipment, rated for use with (A2L or A2) flammable refrigerants

Only use dedicated R32 refrigerant reclaim cylinders for recovered R32 refrigerant

Contact a refrigerant wholesaler or service equipment supplier for more information on the equipment needed to handle R32 refrigerant.

Training for R32

Suitable trade training in flammable refrigerants is recommended prior to working on systems containing flammable refrigerants.

It is a requirement under work health and safety obligations that employers must ensure only competent workers work on air conditioners and other refrigeration systems, particularly those containing flammable refrigerants. Workers must be provided with appropriate information and training on the hazards and safe use of the specific refrigerants to which they could be exposed when performing installation, commissioning, service, repair, maintenance and decommissioning of refrigeration and air conditioning equipment.

A national unit of competency is available for A2L refrigerants (including R32) – VU22583 Class A2/A2L Flammable Refrigerants. It sits in the course – 22329 VIC Heating, Ventilation and Air Conditioning Service as an elective. To read more about this unit of competency visit **https://training.gov.au/Training/Details/VU22583**.

To find registered training organisations visit **www.training.gov.au**

Check with the relevant state-based WorkSafe agencies and refer to the relevant material safety data sheets available from refrigerant wholesalers for specific safeguards when handling R32.

For further information on how to handle flammable refrigerants, refer to the Flammable Refrigerants Safety Guide (2018) online at **http://www.pointsbuild.com.au/airah** under 'managing health and safety risks for flammable refrigerants'.

See the 'More information' section for details on how to access relevant Australian Standards.

Allowable charge of R32

The allowable charge in an A2L residential or light commercial air conditioning system is specified in Australian Standard AS/NZS 60335.2.40 and takes into consideration variables such as the room floor area, height of the air conditioner, type of air conditioner, characteristics of the particular refrigerant, the level of ventilation and the application of risk mitigation devices (e.g. sensors, alarms etc).

The common room volume calculation of 20 per cent is not applicable for systems operating on R32. Considering the number of variables and the complexity of the required calculations, the Australian Standard mandates that the manufacturer shall perform the calculations and that the installation instruction will clearly show the resulting minimum floor area that the equipment can be installed into under likely installation scenarios.

Where can I buy R32?

R32 is available from most refrigerant wholesalers and stationary air conditioning component suppliers.

Can I convert an existing R410A system to R32?

No. R32 is not suitable as a drop-in replacement for R410A and must only be used in systems specifically designed for R32.

R410A systems are not designed to operate using a flammable refrigerant and would require extensive modification and laboratory validation to confirm that the safety level has been increased to a level that satisfies the requirements of international standards set for systems that use R32.

It is not just the electrical components that must be compliant with the mandatory safety requirements (i.e. AS/NZS 60335.2.40) for the refrigerant used, it is the whole air conditioner.

This includes surface temperatures, operating and installation instructions, markings and warning labels, mechanical strength etc. Anyone doing a conversion or modification takes on the responsibilities of the designer/manufacturer and therefore must certify that the modified product is compliant with all applicable codes and standards. Compliance with AS/NZS 60335.2.40 can only be ascertained by physical testing in a laboratory and AS/NZS 5149.1:2016 has refrigerant charge limit requirements. As a result, it would be difficult for any technician to confirm compliance.

More information

Refrigerant Handling Code of Practice 2007 Part 1 – Self-Contained Low Charge Systems and Part 2 – Systems other than Self Contained Low Charge Systems **www.arctick.org/refrigerant-handling-licence/codes-of-practice/**

Flammable Refrigerants Safety Guide (2018)
http://www.pointsbuild.com.au/airah under 'managing health and safety risks for flammable refrigerants'.

To access the relevant Australian Standards visit www.standards.org.au

Australia's HFC phase-down – **www.environment.gov.au/protection/ozone/publications/hfc-phase-down-factsheet**

Contact the relevant equipment manufacturer, importer or supplier/wholesaler for further information on R32.

Australian Refrigeration Council (ARC)

The ARC administers the refrigeration and air conditioning industry Permit Scheme on behalf of the Australian Government, under Australia's Ozone Protection and Synthetic Greenhouse Gas Management legislation.

www.arctick.org

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