



INFORMATION ON ALTERNATIVE FLAMMABLE REFRIGERANTS					TSB #:	64
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Some interesting information from the Australian federal government in regard to the use and safety of flammable refrigerants.



Australian Government

Department of Sustainability, Environment, Water, Population and Communities

SAFETY CONSIDERATIONS WHEN USING FLAMMABLE REFRIGERANTS

Under the Government’s Clean Energy Future Plan, an equivalent carbon price will apply to a range of synthetic greenhouse gases, including hydrofluorocarbons (HFCs) commonly used in refrigeration and air conditioning equipment, from 1 July 2012. HFCs will continue to be available and can still be used to refill equipment in use which is designed for HFCs as their refrigerant.

The equivalent carbon price on synthetic greenhouse gases, including HFCs, will encourage:

- increased recycling of synthetic greenhouse gases, including HFCs
- improved servicing of existing equipment to reduce leakage of refrigerant gases
- a switch to purpose-designed equipment using lower global warming potential (GWP) refrigerants, only where this is appropriate and meets relevant safety standards and legislative requirements
- innovation by manufacturers to develop safe, low GWP refrigerants and suitably designed equipment for those refrigerants.

Alternative refrigerants

Several lower GWP refrigerants are already available in Australia such as ammonia, carbon dioxide and hydrocarbons. Each of these natural alternatives to HFCs have hazard characteristics that are different from those of the commonly used HFCs. Ammonia has high toxicity and medium flammability; carbon dioxide operates at a higher pressure when used as a refrigerant than fluorocarbons; and hydrocarbons are non toxic but are highly flammable.

Overseas and Australian experience is demonstrating that each of these natural alternative refrigerants can be used safely and effectively. In considering the use of alternative refrigerant it is important that they be used in equipment that is fit for purpose and not used in equipment designed for a specific HFC where to do so could introduce safety hazards.



Safety with flammable refrigerants

Refrigeration engineers or technicians are a key source of advice to customers on equipment or refrigerants and will need to be mindful of obligations they may have to provide accurate advice on any safety issues and their implications, particularly if substitution of the original refrigerant by an alternative refrigerant is being contemplated. Customers may need to consider additional matters such as warranty or insurance implications. These aspects may be covered by national, state or territory consumer protection or other legislation.

Strict standards and procedures must be followed when using flammable refrigerants, including hydrocarbons. These vary between states and territories and the relevant authorities should always be consulted to ensure the legal requirements that apply to the use of hydrocarbons for refrigeration and air conditioning purposes are followed.

In some state and territories the use of hydrocarbon refrigerants to repair or service air conditioning systems may be forbidden without authorisation from the relevant authority.

Safety requirements under state and territory work health and safety legislation, which places obligations on importers, designers, manufacturers, suppliers, installers and others to ensure that the work health and safety risks are assessed and eliminated or mitigated, need to be considered when contemplating using or retrofitting hydrocarbon refrigerants.

Licensing requirements

The Commonwealth *Ozone Protection and Synthetic Greenhouse Gas Management Regulations 1995* does not require a refrigerant handling licence for handling natural refrigerants such as hydrocarbons. However, anyone handling fluorocarbon refrigerants (including halocarbons, chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs) and HFCs) must hold an appropriate refrigerant handling licence.

Any individual (including a repairer or dismantler) who removes fluorocarbon refrigerant from any refrigeration or air conditioning system and wants to replace this gas with natural refrigerants, must hold, as a minimum, a Restricted Refrigerant Recoverers Transitional Licence, which can be obtained from the Australian Refrigeration Council at www.arctick.org.

Individuals who handle fluorocarbon refrigerants without a licence are committing an offence.



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Checklist for installing and maintaining equipment

Before using an alternative natural refrigerant, particularly if replacing the fluorocarbon refrigerant with an alternative refrigerant is being contemplated, a number of factors need to be taken into consideration. This includes, but is not limited to the following:

- Do you have appropriate training, skills and license to install and maintain the equipment?
- Is the equipment for use only for a specific HFC whereby substituting with an alternative gas could introduce safety hazards?
- Are you certain of the type of refrigerant gas currently in the equipment, has this been labelled and has it been checked prior to servicing? Do not assume that the refrigerant in the equipment to be serviced is non-flammable. Always check the identity of the refrigerant in the equipment, using a safe method that does not pose an ignition hazard, before beginning work on the equipment.
- Can you legally use an alternative refrigerant (such as hydrocarbon which is flammable) for the particular purpose in your state or territory? Are you aware of the current regulatory controls and standards, codes of practice and other relevant guidance?
- If you can legally use an alternative refrigerant (such as hydrocarbon) for the purpose, have you conducted a comprehensive risk assessment to determine if it is safe to use an alternative refrigerant that is flammable or toxic or operates at high pressure in the particular circumstances?
- Has the unit's manufacturer and the refrigerant supplier approved the use of a flammable, toxic or high pressure refrigerant in the system?
- If a retrofit is to be undertaken, how can you assess the safety and suitability for purpose?
- Has the equipment manufacturer given approval for retrofitting the equipment using an alternative refrigerant?



- Has the owner or user of the refrigeration or air conditioning equipment been advised that a flammable, toxic or high pressure alternative refrigerant is proposed to be used, been made aware of the risks involved and given written approval to its installation?
- Have all applicable standards, codes of practice and other relevant guidance been taken into account (e.g. AS/NZS 1677.2 1998. Refrigerating systems Part 2: Safety requirements for fixed installations)?
 - Is the quantity of refrigerant (charge size) appropriate for the the occupancy category and the room size to ensure that a sudden loss of refrigerant does not raise the mean concentration of the refrigerant above 20% of the lower flammability limit?
 - Is there adequate ventilation?
 - Is there a potential source of ignition? Are all electrical contacts sealed or non-sparking? What is the Lower Explosive Limit of the proposed refrigerant?
 - Is a suitable (non-ignition source) leak detection system installed?
 - Is there appropriate and permanent labelling applied to all vessels, cylinders and refrigeration systems indicating that a flammable refrigerant has been used?

Checklist for consumers having equipment installed and maintained

Consumers considering the use of alternative refrigerants may wish to consider the following:

- Does the technician have the appropriate training, skills and licensing to install and maintain the equipment? The Australian Refrigerant Council provides a full list of licensed technicians at www.lookforthetick.com.au.
- Have the technicians explained what work they are doing and why and outlined any risks associated with the work they are doing?
- If a flammable refrigerant is proposed to be used, have you been made aware of the risks involved and have you given written approval to proceed with the installation?
- Replacement of synthetic greenhouse gases in equipment with an alternative refrigerant may void the equipment warranty or have insurance implications. Ask the technician and check with the equipment manufacturer and your insurer.



More information

For more information about the government's administration of synthetic greenhouse gases, please visit www.environment.gov.au/equivalentcarbonprice, email ozone@environment.gov.au or phone the department on 1800 803 772.

For more information about the Clean Energy Future package, visit the website:
www.cleanenergyfuture.gov.au/clean-energy-future/our-plan.

The Australian Competition and Consumer Commission provides information about the carbon price and business or consumer rights. Visit the website:
www.accc.gov.au/content/index.phtml/itemId/1017091.