



Mines Safety Bulletin No. 100 and Dangerous Goods Safety Bulletin No. 0312

Subject: Safe use of flammable refrigerants

Date: 1 August 2012

Summary of hazard

Employers in Western Australia need to recognise that they may change the hazard profile of their operation if they replace the original equipment manufacturer (OEM) supplied refrigerant with a hydrocarbon refrigerant in their mobile equipment air-conditioners or other refrigeration systems.

A hydrocarbon refrigerant may reduce some hazards (e.g. toxicity, environmental damage), but other hazards may be increased (e.g. fire).

Mines Safety Significant Incident Report No. 177, issued on 18 April 2012, described an incident where an employee received burns following an incident involving the ignition of hydrocarbon gas that had leaked from the vehicle's air-conditioning system.

Contributory factors

The higher cost of fluorocarbon refrigerants compared with hydrocarbon refrigerants, may provide an economic incentive to convert from one to the other.

The use of hydrocarbon refrigerants may also be seen as a lower cost alternative when the certification requirements of the tradespeople involved in handling fluorocarbon refrigerants is taken into account.

Requirements

- The employer, designer, manufacturer, importer and supplier all have a duty of care under the *Mines Safety and Inspection Act 1994* (see sections 9 and 14) in relation to the refrigerant used in mobile equipment air-conditioners and other refrigeration systems.
- Under section 8 of the *Dangerous Goods Safety Act 2004*, persons involved in the storage and handling of dangerous goods have a duty to minimise risk to as low as reasonably practicable.
- Any person who handles fluorocarbon refrigerant gases, such as R12, R22, R134a and R410a, must hold a National Refrigerant Handling Licence. For example, any technician who decants or reclaims gas, decommissions or installs refrigeration systems is required to be licensed.
- Gas detection equipment is required if the rated refrigeration plant exceeds 100kW(R) – see r. 9.25(3) of the *Mines Safety and Inspection Regulations 1995*.
- Under the dangerous goods safety legislation, hydrocarbon refrigerants and the cylinders used to store such refrigerants should comply with relevant Australian Standards.

Safer practices

The employer is responsible for arriving at a defensible, informed and documented decision regarding any substitution of refrigerants used in mobile equipment air-conditioners and other refrigeration systems at the operation.

The following actions are considered by the refrigeration industry to deliver safer practice.

- Before using hydrocarbon refrigerants as a substitute to re-gas an air-conditioner or other refrigeration system, obtain written advice from the system's designer, manufacturer or supplier on their safe use.
- Implement a preventative maintenance program for air-conditioners and other refrigeration systems.
- Only competent personnel should work on air-conditioners and other refrigeration systems, particularly those containing hydrocarbon refrigerants.
- Do not top up a refrigeration system without first checking for and fixing any leaks.
- Only use equipment that is rated for hazardous zone use (i.e. flame-proof) near sources of flammable refrigerant.
- Whenever a flammable refrigerant is placed in a mobile equipment air-conditioning system, affix a label in a prominent place in the engine bay to make it clear what refrigerant is used, and how much is used. It should incorporate the flammable gas (Division 2.1) class label.
- Hydrocarbon refrigerants should be odourised to aid in their detection.

Additional information

- Australian Refrigeration Council Ltd
The Australian automotive code of practice 2008: Control of refrigerant gases during manufacture, installation, servicing or de-commissioning of motor vehicle air conditioners
www.arctick.org/faq_1.php
- WorkCover New South Wales and Motor Vehicle Repair Industry Authority
Safety alert – Use of flammable hydrocarbon gases in MVACS
www.workcover.nsw.gov.au/formspublications/publications/Documents/safety_alert_use_of_flammable_hydrocarbons_mvacs_4793.pdf
- SafeWork, South Australia
Hazard alert – Use of flammable refrigerants including hydrocarbon mixes
www.safework.sa.gov.au/uploaded_files/hazalert84a.pdf
- Department of Labour, New Zealand
Hazard alert – Coolstore hydrocarbon refrigerant injures technician, Factsheet – Safe use of hydrocarbon refrigerants
osh.dol.govt.nz/publications/series/haz70-coolstore-refrigerant.html and
osh.dol.govt.nz/order/catalogue/pdf/hydrocarbon-refrigerants.pdf

- Australian Standards
 - AS 1210:2010 *Pressure vessels*
 - AS/NZS 1596:2008 *The storage and handling of LP Gas*
 - AS/NZS 1677 Set:1998 *Refrigerating systems*
 - AS/NZS 3788:2006 *Pressure equipment – In-service inspection*
 - AS/NZS 3823 Set:2012 *Performance of electrical appliances – Air conditioners and heat pumps*
 - AS 4041:2006 *Pressure piping*
 - AS 4343:2005 *Pressure equipment – Hazard levels*
 - AS/NZS 60079.10.1:2009 *Explosive atmospheres – Classification of areas*
 - HB 40 Set:2005 *Australian refrigeration and air-conditioning code of good practice set*
www.saiglobal.com
- Compressed Gas Association Safety Bulletins
 - CGA SB 1:2011 *Hazards of refilling or reusing compressed refrigerant (halogenated hydrocarbon) gas cylinders*
 - CGA SB 18:2000 *Use of refrigerant (halogenated hydrocarbons) recovery cylinders*
www.cganet.com



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