WORKSAFE
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Hydrocarbon refrigerants

This technical bulletin is aimed at businesses who design, manufacture, install, maintain, or repair air-conditioning, heat pump or refrigeration equipment that uses a hydrocarbon refrigerant.

Introduction

An uncontrolled release or leak of hydrocarbon gas from refrigeration plant is a health and safety risk which has the potential to cause a serious fire or explosion.

This guidance is to remind businesses that all equipment that uses hydrocarbon refrigerants must comply with the relevant safety standards and regulations.

Background

New Zealand is one of many countries who have agreed to take steps to reduce and eliminate the use of environmentally harmful refrigerants, such as hydrofluorocarbons (HFCs) and hydrochlorofluorocarbons (HCFCs).

The refrigerants that are being introduced to replace HFCs and HCFCs are typically hydrocarbons which are flammable. This is leading to the regulation of the importation, exportation and use of those refrigerants.

What are hydrocarbon refrigerants?

Hydrocarbon refrigerants are natural, non-toxic refrigerants. Their use is becoming popular as they are one of the most climate-friendly and cost-effective refrigerants used in heating and cooling.

All hydrocarbon refrigerants are classified as highly flammable.

Refrigerant	Substance	Classification[1]	Level of flammability
R290	propane	A3	High flammability
R600a	isobutane	A3	High flammability
R1270	propylene	A3	High flammability

Table 1: Common examples of hydrocarbon refrigerants

[1] According to standard AS/NZS ISO 817:2016

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Designing, manufacturing or installing equipment that uses a hydrocarbon refrigerant

Refrigeration, air-conditioning and heat-pump equipment that uses flammable refrigerants must be designed and installed specifically for those refrigerants to avoid being in breach of:

- Electricity (Safety) Regulations 2010
- Health and Safety at Work (Hazardous Substances) Regulations 2017 (the Hazardous Substances Regulations).

Under the Hazardous Substances Regulations air-conditioning, heat pump or refrigeration equipment operating on a hydrocarbon refrigerant must comply with AS/NZS 5149:2016.

Note: The Hazardous Substances Regulations do not apply to domestic refrigerators, domestic heat pumps, or room air conditioners. These are required to comply with relevant appliance standard (AS/NZS 60335).

Repairing or maintaining equipment, including replacing refrigerants

Concerns have been raised about companies who retrofit hydrocarbon refrigerant into existing air-conditioning, heat pump or refrigeration equipment that is not specifically designed for a flammable type.

This greatly increases the risk of a serious fire or explosion.

Under the Electricity (Safety) Regulations 2010, an installation is deemed **unsafe** if it is retrofitted with a refrigerant other than the one that it was designed to operate on.

The replacement of a non-flammable refrigerant with a flammable refrigerant renders the heatpump, refrigeration or air-conditioning system unsafe unless:

- the equipment has been adapted to operate safely; or
- the equipment was designed to be retrofitted with that refrigerant.

Note: Technicians should update the maintenance register with the date works were carried out.

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Standards

AS/NZS ISO 817:2016 Refrigerants – Designation and safety classification – safety classification

AS/NZS 5149:2016 (Parts 1 – 4) Refrigerating systems and heat pumps – safety and environmental requirements

More information

Flammable Refrigerants – Be Informed, Be Aware Fact Sheets 1 – 4 www.cccanz.org.nz

Flammable Refrigerant Safety Guide (2013) and Update 1 (2018) www.airah.org.au

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