Title	**Demonstrate knowledge of refrigerants and their use in mechanical building services**		
Level	**3**	**Credits**	**3**

Purpose	This unit standard is intended primarily for use in the training of personnel in the mechanical building services industry. It covers basic knowledge of refrigerants and the legislative requirements for their use in mechanical building services. People credited with this unit standard are able to demonstrate knowledge of: legislation, codes of practice, and the management of hazards associated with refrigerants; commonly used refrigerants; the effect of refrigerants on the atmosphere. Learners are also able to recognise and interpret refrigerant labelling and take precautions when handling refrigerants.

Classification	Mechanical Engineering > Heating, Ventilating, and Air Conditioning

Available grade	Achieved

Guidance Information

1 References and legislation
Hazardous Substances and New Organisms Act 1996.
Health and Safety at Work Act 2015.
Ozone Layer Protection Act 1996.
Ozone Layer Protection Regulations 1996.
AIRAH and IRHACE. *Australia and New Zealand Refrigerant Handling Code of Practice 2007, Parts 1 and 2.* Available from www.irhace.org.nz.
ANSI/ASHRAE Standard 34-2016, *Designation and Safety Classification of Refrigerants*. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. Available from http://www.ashrae.org.
AS/NZS ISO 817:2016, *Refrigerants - Designation and safety classification*. Available from http://www.standards.govt.nz.
Hazchem Code. Available from http://www.nzsafety.co.nz/graphics/nzsafety/pdf/hazchemcodekey.pdf.
AS/NZS 5149.4:2016, *Refrigerating systems and heat pumps – Safety and environmental requirements – Part 4: Operation, maintenance, repair and recovery*. Available from http://www.standards.govt.nz.
AS/NZS 60079.10.1:2009, *Explosive atmospheres - Classification of areas - Explosive gas atmospheres*. Available from http://www.standards.govt.nz.

CCCANZ, *New flammable refrigerant fact sheets (four of)*. Available at https://www.standards.govt.nz/touchstone/fire-protection/2018/jun/new-flammable-refrigerant-fact-sheets/.

2 Definitions
GWP – Global warming potential.
CCCANZ – Climate Control Companies Association New Zealand.
ODP – Ozone depletion potential.
ODR – Ozone depleting refrigerants.
ODS – Ozone depleting substance.
SDS – Safety data sheet.
SGG – Synthetic greenhouse gas.

3 Assessment information
Appropriate tables of refrigerant properties and SDSs must be made available to the candidates by the training provider or the assessor.

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of legislation, codes of practice, and the management of hazards associated with refrigerants.

Performance criteria

1.1 Legislation, code of practice, and technical guide, for the safe use and management of refrigerants, are briefly outlined in terms of their purpose and content.

Range Health and Safety at Work Act 2015, Ozone Layer Protection Act 1996, Australia and New Zealand Refrigerant Handling Code of Practice 2007.

1.2 The purpose of Hazardous Substances and New Organisms (HSNO) codes for hazardous substances is explained, and the meanings of Classes 2.1.1A and 2.1.1B interpreted.

1.3 The purpose of Hazchem Code or Emergency Action Codes is explained, and the meaning of Hazchem Code 2RE described. The Hazchem Code for a given refrigerant is identified.

1.4 The purpose of a SDS is explained, and relevant information retrieved from a given SDS.

1.5 Hazards associated with refrigerants are described.

Range hazards – flammability, toxicity, asphyxiation, ozone depletion effects, global warming; hazards associated with pressure vessels; refrigerants – F-gases, hydrocarbons, ammonia.

1.6 Methods of managing refrigerant hazards are described.

Range avoidance of leakage, leak detection methods and equipment, ventilation, use of personal protective equipment, first aid measures, labelling of cylinders and equipment, warning signs, training and certification of fillers and handlers.

1.7 Minimum requirements for personal protective equipment when working with refrigerants used in mechanical building services are described.

Outcome 2

Demonstrate knowledge of commonly used refrigerants.

Range R410a, R32, R134a, R717, R744, R290.

Performance criteria

2.1 The term *refrigerant* is explained in terms of heat transfer.

2.2 Characteristics of commonly used refrigerants are described.

Range characteristics – critical temperature, toxicity, flammability, ODP, GWP.

2.3 Systems where commonly used refrigerants are likely to be found are identified.

Outcome 3

Demonstrate knowledge of the effect of refrigerants on the atmosphere**.**

Performance criteria

3.1 ODRs are described in terms of their contribution to stratospheric ozone depletion.

3.2 The GWP of gases and its relevance to refrigeration and air conditioning is described.

Outcome 4

Recognise and interpret refrigerant labelling and take precautions when handling refrigerants.

Performance criteria

4.1 System labels are interpreted and refrigerant types are identified.

4.2 Methods for safe handling and storing of refrigerants including ODRs and SGGs are described.

Planned review date	31 December 2023

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	26 April 2018	31 December 2018
Review	2	1 November 2018	N/A

Consent and Moderation Requirements (CMR) reference	0013

This CMR can be accessed at http://www.nzqa.govt.nz/framework/search/index.do.

Comments on this unit standard

Please contact Competenz qualifications@competenz.org.nz if you wish to suggest changes to the content of this unit standard.