Title	**Modify industrial refrigeration systems**		
Level	**4**	**Credits**	**20**

Purpose	This unit standard is for people who work in the refrigeration and air conditioning sector of the engineering industry. People credited with this unit standard are able to, for industrial refrigeration systems: prepare for modification; install components to modify; and charge the components with lubricants and secondary heat transfer liquids as required.

Classification	Mechanical Engineering > Refrigeration and Air Conditioning

Available grade	Achieved

Prerequisites	People undergoing training and assessment towards the competencies in this unit standard must be licensed by the Electrical Workers Registration Board as Electrical Service Technician.

Guidance Information

1 Recommended skills and knowledge:
Unit 28959, *Demonstrate knowledge of installation and commissioning procedures for commercial RAC equipment*;
Unit 28963, *Install commercial RAC equipment under supervision*.

2 Legislation and standards
Health and Safety at Work Act 2015;
Building Act 2004;
Climate Change Response Act 2002;
Electricity (Safety) Regulations 2010;
Electricity Act 1992;
Hazardous Substances and New Organisms Amendment Act 2015;
Ozone Layer Protection Act 1996;
AS/NZS 5149:2016 *Parts 1:5 Refrigerating Systems and Heat pumps – Safety and environment requirements;*
AS/NZS 817:2016 *Refrigerants – Designation and safety classification*;
AS/NZS 3000:2007 *Electrical installations (known as the Australian/New Zealand Wiring Rules)*;
and any subsequent amendments.

3 References

Althouse, Turnquist, Bracciano. *Modern Refrigeration and Air Conditioning*. 19th edition. Tinley Park, Illinois: The Goodhouse-Willcox Company Inc. ISBN 1-59070-280-8.
Institute of Refrigeration, Heating and Air Conditioning Engineers of New Zealand (IRHACE New Zealand). *2001 Code of Practice for the reduction of emissions of fluorocarbon refrigerants in refrigeration and air conditioning applications*. Available from IRHACE, http://www.irhace.org.nz/.

4 All worksite practices must meet recognised codes of practice and documented safety procedures and safety plans (where these exceed the code) for personal and worksite safety, and obligations required under current legislation.

5 Definitions
Approved industry practices refer to approved codes of practice and standardised procedures accepted by the wider refrigeration and air conditioning industry sectors as examples of best practice.
Industrial refrigeration systems refer to systems such as: single or multi-staged refrigeration systems (typically using ammonia refrigerant) used in the manufacturing process in areas such as freezing works, breweries, and chemical plants.
EWRB refers to the Electrical Workers Registration Board.
Worksite procedures refer to documented procedures used by the organisation carrying out the work and applicable to the tasks being carried out. They may include but are not limited to – standard operating procedures, site safety procedures, equipment operating procedures, codes of practice, quality assurance procedures, housekeeping standards, procedures to comply with legislative and local body requirements.

6 Assessment information
This unit standard may be assessed in the workplace using naturally occurring evidence or in a simulated environment that demands performance equivalent to that required in the workplace.

Outcomes and performance criteria

Outcome 1

Prepare for the modification of industrial refrigeration systems.

Performance criteria

1.1 Modification drawings, schedule of materials, and instructions are checked against site conditions, and confirmed or modified to suit site conditions in accordance with worksite procedures.

1.2 Timeframe for modification is established and agreed with stakeholders in accordance with approved industry practice.

Range stakeholders may include but are not limited to – manager, supervisor, contract manager, contractor, internal staff.

1.3 Materials are assembled and verified against schedule of materials.

1.4 Ancillary service connections are verified and timetabled in accordance with modification time schedule.

Range may include but is not limited to – water, electricity, gas, plumbing.

1.5 The ability to meet building code requirements for the modification is confirmed and, where required, permits and/or consents are identified and confirmed as suitable.

1.6 The section of the system to be modified is isolated as required and prepared for modification in accordance with worksite procedures.

1.7 Safety precautions are implemented to protect personnel, equipment, and property in accordance with worksite procedures.

Range may include but is not limited to – warning notices, identifications, equipment isolation, electrical isolation.

Outcome 2

Install components to modify industrial refrigeration systems.

Performance criteria

2.1 Major components are positioned and secured in accordance with drawings, designs, specifications, and instructions.

Range components include but are not limited to – compressor, condenser, evaporator, metering device.

2.2 Supports and bracketing to secure pipework and any ductwork are positioned and fixed in accordance with drawings, designs, specifications, and instructions.

2.3 Piping, tubing, and any ducting are run in accordance with drawings, designs, and specifications.

2.4 Thermal insulation is secured in accordance with drawings, designs, and specifications.

2.5 Ancillary components such as valves and controls are installed in accordance with drawings, designs, and specifications.

2.6 Where applicable, the integrity of building penetrations is confirmed by appropriate visual and tactile checks.

2.7 The work of associated tradespeople is identified and requested to enable project to proceed as scheduled in accordance with worksite procedures.

2.8 Any delays caused by associated tradespeople are communicated to stakeholders and installation is completed in accordance with agreed or revised timeframe.

Range stakeholders may include but are not limited to – manager, supervisor, contract manager, contractor, internal staff.

Outcome 3

Charge the components of industrial refrigeration systems with lubricants and secondary heat transfer fluids as required.

Performance criteria

3.1 Component and system integrity are confirmed.

3.2 Components and systems are charged with lubricants and secondary heat transfer fluids in accordance with system instructions, specifications, and worksite procedures.

3.3 Fluid and other identifications are affixed to components and systems in accordance with industry codes and regulations and verified with technical supervisor.

3.4 Job content, materials, and labour inputs are described for both invoicing and customer reports in accordance with worksite procedures.

Planned review date	31 December 2020

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	9 April 1995	31 December 2017
Revision	2	14 April 1997	31 December 2017
Revision	3	5 January 1999	31 December 2017
Revision	4	13 November 2001	31 December 2017
Review	5	20 June 2006	31 December 2019
Review	6	18 June 2015	31 December 2020
Revision	7	16 February 2017	N/A
Revision	8	22 October 2020	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.