

Title	Service industrial refrigeration systems		
Level	4	Credits	25

Purpose	<p>This unit standard is for people who work in the refrigeration and air conditioning sector of the engineering industry.</p> <p>People credited with this unit standard are able to, for industrial refrigeration systems: interpret system drawings and diagrams; diagnose faults and rectify common faults in systems; and complete servicing activities and documentation, and recommission systems.</p>
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Classification	Mechanical Engineering > Refrigeration and Air Conditioning
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Available grade	Achieved
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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.
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Guidance Information

- 1 Recommended skills and knowledge:
 - Unit 28960, *Demonstrate knowledge of commercial RAC system maintenance and servicing*;
 - Unit 28965, *Maintain and service commercial RAC systems and 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;
 - Electricity Amendment Act 1997;
 - 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 Reference

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.

EWRB refers to Electrical Workers Registration Board.

Industrial refrigeration systems refer to items 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.

Worksite procedures refers 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 Range

Competence is to be demonstrated on three occasions of servicing industrial refrigeration systems.

Outcomes and performance criteria

Outcome 1

Interpret industrial refrigeration system drawings and diagrams.

Performance criteria

- 1.1 Componentry is recognised and layout of systems is established from site drawings.
- 1.2 Correct sequence of system operation is determined from wiring diagrams and piping schematics.
- 1.3 Timeframes for servicing are 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.

Outcome 2

Diagnose faults in industrial refrigeration systems.

Performance criteria

2.1 Faults are identified and diagnosed through information provided by users and/or operators, and the use of human senses.

Range human senses may include any of – sight, hearing, smell, touch.

2.2 Faults are identified and diagnosed through pressure drops and temperatures.

2.3 Faults are identified and diagnosed through tests.

Range tests may include but are not limited to – electrical circuit's continuity and mode, conductor and insulation resistance, componentry integrity, voltages, current draw, phase sequence.

Outcome 3

Rectify common faults in industrial refrigeration systems.

Performance criteria

3.1 Components in refrigeration and air conditioning systems are pumped-down and isolated in accordance with worksite procedures.

3.2 Faults are rectified, and, where required, refrigeration components are reconditioned and overhauled in accordance with worksite procedures.

Range faults may include but are not limited to – electrical, mechanical, electronic, fluid;
components may include but are not limited to – compressors, pressure regulating valves, pumps, fans, motors.

3.3 Procedures 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 4

Complete servicing activities and documentation, and recommission systems.

Performance criteria

4.1 Servicing activities are completed in accordance with agreed timeframes.

- 4.2 Where applicable, the integrity of building penetrations is confirmed by appropriate visual and tactile checks.
- 4.3 Relocated, repaired, and/or converted equipment and systems are reassembled, tested, and recommissioned to meet system specifications.
- 4.4 Manuals are updated to match current specifications.
- 4.5 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
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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
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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.