Title	**Commission commercial RAC systems rated above 50 kilowatts**		
Level	**5**	**Credits**	**25**

Purpose	This unit standard is intended for people who work on light industrial refrigeration systems that use non ammonia refrigerants. People credited with this unit standard are able to, for light industrial refrigeration systems: verify the integrity of systems; evacuate systems; perform pre-start checks on systems; charge systems and confirm the operation of systems; complete commissioning activities, check and verify operating manuals, and instruct operators.

Classification	Mechanical Engineering > Refrigeration and Air Conditioning

Available grade	Achieved

Prerequisites	People undergoing training and assessment towards the competencies in this unit standard must hold the appropriate EWRB certificate and an Electrical Service Technician practising licence.

Guidance Information

1 Recommended skills and knowledge
Unit 3841, *Commission commercial refrigeration and/or air conditioning systems rated below 50 kilowatts*.

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 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.
Commercial RAC systems rated above 50 kilowatts refer to single or multistage refrigeration systems rated above 50kW, use refrigerants other than ammonia, and are used in situations such as food retail, logistics and manufacturing processes in areas such as supermarkets, cold storage, food processing and product manufacture.
EWRB refers to the Electrical Workers Registration Board.
RAC refers to refrigeration and air conditioning.
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.

5 Assessment information

This unit standard is intended to be assessed in the workplace using naturally occurring evidence.
All work must be carried out in accordance with worksite procedures.

Outcomes and performance criteria

Outcome 1

Verify the integrity of light industrial refrigeration systems.

Performance criteria

1.1 Timeframes for commissioning are established and agreed with stakeholders in accordance with approved industry practice.

Range stakeholders may include but are not limited to – internal staff, customers.

1.2 Systems are prepared for commissioning.

1.3 Systems are tested for leaks.

1.4 System safety devices are tested, and systems are verified as safe to be exposed to operating pressures.

1.5 Ancillary pipework is flushed, purged, and verified clean and leak free.

Outcome 2

Evacuate light industrial refrigeration systems.

Performance criteria

2.1 Unwanted moisture and gases are removed from systems by evacuating them to the required levels of high vacuum.

2.2 Refrigerant is recovered and stored.

2.3 Vacuums are broken with appropriate refrigerants prior to charging.

Outcome 3

Perform pre-start checks on light industrial refrigeration systems.

Performance criteria

3.1 Controls are tested and set to meet performance and safety requirements.

3.2 Programmable controller inputs and outputs are tested and compliance with performance requirements is confirmed.

3.3 Electrical systems are checked and compliance with performance and safety requirements is confirmed.

3.4 Motor and pump rotation directions are checked and comply with system specifications.

3.5 Motor ratings are verified against fuse ratings and overload settings.

3.6 Fluid flows are tested and balanced.

3.7 Noise and vibration levels are confirmed as within limits.

Outcome 4

Charge light industrial refrigeration systems and confirm the operation of systems.

Performance criteria

4.1 Systems are charged with refrigerants in accordance with system specifications.

4.2 Systems are test-run, checked, and adjusted as required to meet performance requirements.

4.3 Super-heats are tested and adjusted as required to meet performance requirements.

4.4 Control settings are verified for operational performance in accordance with system specifications.

4.5 Refrigerant and oil levels and flows are adjusted as required to meet performance requirements.

4.6 System performance data is recorded in accordance with operational specifications and worksite procedures.

Range temperatures, pressures, super-heats, current draw, fluid flows, humidity, sub-cooling.

Outcome 5

Complete commissioning activities, check and verify operating manuals, and instruct operators of light industrial refrigeration systems.

Performance criteria

5.1 Commissioning activities are completed in accordance with agreed timeframes.

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

5.3 Warranty cards are completed.

5.4 Manuals and operating instructions are finalised and verified as matching commissioned refrigeration systems.

5.5 Operators are familiarised with manuals and operating instructions.

5.6 Operators are instructed to operate refrigeration and air conditioning systems within design parameters, and in accordance with operational and worksite procedures.

5.7 Job content, materials, and labour inputs are described for both invoicing and customer reports.

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	18 June 2015	31 December 2020
Revision	2	16 February 2017	N/A
Revision	3	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.