

Title	Commission RAC systems for controlled temperature transport applications		
Level	4	Credits	20

Purpose	<p>This unit standard is for people who work in the refrigeration and air conditioning (RAC) sector of the engineering industry and specialise in controlled temperature transport.</p> <p>People credited with this unit standard are able to: prepare to commission RAC systems; evacuate RAC systems; perform pre-start checks on RAC systems; charge RAC systems and confirm their operation; and complete commissioning activities for RAC 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

- Recommended skills and knowledge:
Unit 28959, *Demonstrate knowledge of installation and commissioning procedures for commercial RAC equipment*;
Unit 28957, *Install commercial RAC equipment and systems in temperature controlled transport applications*.
- Legislation and standards
Health and Safety at Work Act 2015;
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 work must be carried out in accordance with worksite procedures. 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

RAC systems refer to refrigeration systems found in: retail food outlets, truck and shipping containers, horticultural cool rooms, controlled atmosphere food stores; and air conditioning equipment used in commercial buildings.

Controlled temperature transport applications refer to refrigeration and air conditioning systems used in road vehicles, and truck and shipping containers.

EWRB refers to electrical workers registration board.

Standard industry practices refer to standard and proven industry practices accepted by the refrigeration and air conditioning industry.

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 Range

Competence is to be demonstrated on three occasions of commissioning systems in transport applications. These systems may be any of refrigeration; air conditioning; or combined refrigeration and air conditioning.

Outcomes and performance criteria

Outcome 1

Prepare to commission RAC systems.

Performance criteria

- 1.1 Timeframes for commissioning are established and agreed with stakeholders in accordance with worksite procedures.

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

- 1.2 Systems are prepared for commissioning in accordance with worksite procedures.

- 1.3 Systems are tested to specified pressures in accordance with worksite procedures and system specifications and are verified as leak free.
- 1.4 System safety devices are tested, and systems are verified as safe to be exposed to operating pressures.
- 1.5 Ancillary pipework is verified clean and leak free.

Outcome 2

Evacuate RAC systems.

Performance criteria

- 2.1 Unwanted moisture and gases are removed by evacuating systems to the required high vacuum levels.
- 2.2 Vacuums are broken with appropriate refrigerants prior to charging.

Outcome 3

Perform pre-start checks on RAC 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 verified against specifications.
- 3.5 Motor ratings are verified against fuse ratings and overload settings.
- 3.6 Fluid flows are tested and balanced in accordance with workplace procedures.
- 3.7 Noise and vibration levels are confirmed as within limits in accordance with worksite procedures.

Outcome 4

Charge RAC systems and confirm their operation.

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 worksite procedures.
- Range may include – temperatures, pressures, super-heats, current draw, fluid flows, humidity, sub-cooling.

Outcome 5

Complete commissioning activities for RAC systems.

Performance criteria

- 5.1 Airflow within the controlled space is confirmed by appropriate visual and/or physical checks.
- 5.2 System is labelled in accordance with worksite procedures and standard industry practices.
- 5.3 Warranty documents are completed in accordance with worksite procedures.
- 5.4 Manuals and operating instructions are finalised and verified as matching commissioned RAC systems.
- 5.5 Operators are familiarised with manuals and operating instructions in accordance with worksite procedures.
- 5.6 Operators are instructed to operate RAC systems within design parameters, and in accordance with worksite procedures.
- 5.7 Job content, materials, and labour inputs are documented for invoicing and customer reports in accordance with worksite procedures.
- 5.8 Commissioning activities are completed in accordance with agreed timeframes.

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	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
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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.