Title	**Diagnose and rectify faults in commercial RAC systems and equipment under supervision**		
Level	**3**	**Credits**	**8**

Purpose	This unit standard is for people working or intending to work in in the refrigeration and air conditioning (RAC) industry. People credited with this unit standard are able to, under supervision: prepare to diagnose and rectify faults in commercial RAC mechanical and electrical systems; diagnose and rectify faults in RAC mechanical systems and components; diagnose and rectify faults in RAC electrical and electronic systems and components; and complete fault diagnosis and repair procedures.

Classification	Mechanical Engineering > Refrigeration and Air Conditioning

Available grade	Achieved

Prerequisites	Unit 15852, *Isolate and test low-voltage electrical subcircuits*; Unit 6401, *Provide first aid;* and Unit 6402, *Provide basic life support*; or demonstrate equivalent knowledge and skills.

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*;
or demonstrate equivalent knowledge and skills.

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
Commercial 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.
EST refers to electrical service technician.
Standard industry practice refers to standard and proven industry practices accepted by the refrigeration and air conditioning industry.
Under supervision means under the oversight and guidance of an experienced and authorised person holding an Electrical Service Technician licence who takes overall responsibility for the work carried out.
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.
All work must be carried out under supervision and in accordance with worksite procedures.

Outcomes and performance criteria

Outcome 1

Prepare to diagnose and rectify faults in commercial RAC mechanical and electrical systems.

Performance criteria

1.1 Symptoms of faults are identified and verified from service instructions and/or fault reports.

1.2 Preliminary assessment is made, and the nature of the faults and probable causes are established.

1.3 Resources required for work are determined and obtained.

Range tools, equipment, parts, materials, documents, manuals.

1.4 System operation and performance is measured against system specifications.

1.5 Worksite is made ready for fault diagnosis and repair work.

Range advice to affected personnel, lockout tagout, hazards managed.

1.6 Work required by other trades is coordinated to meet the work schedule and minimise lost time.

Outcome 2

Diagnose and rectify faults in RAC mechanical systems and components.

Range at least two different faults in mechanical systems or components.

Performance criteria

2.1 Reported faults are diagnosed in a logical and systematic manner in accordance with standard industry practice.

2.2 Underlying causes are correctly established and documented in accordance with worksite procedures.

2.3 Faults are rectified in accordance with standard industry practice.

Range repair, adjust, replace components.

Outcome 3

Diagnose and rectify faults in RAC electrical and electronic systems and components.

Range may include faults in – electric motors, controllers, protective devices, wiring, sensors, thermostats, relays, switches, contactors.

Performance criteria

3.1 Reported faults are diagnosed in a logical and systematic manner in accordance with industry practice.

3.2 Underlying causes are correctly established and documented in accordance with worksite procedures.

3.3 Faults are rectified in accordance with standard industry practices.

Range repair, adjust, replace components.

Outcome 4

Complete fault diagnosis and repair procedures.

Performance criteria

4.1 Systems are tested in accordance with standard industry practices and confirms that faults have been repaired.

4.2 Worksite is reinstated to its required operational state.

Range tools, equipment and materials removed; lockout tagout; leftover parts and materials disposed of; tidiness.

4.3 System status is notified to effected personnel.

4.4 Documentation is completed in accordance with worksite procedures.

Range may include – records of work carried out; reports; changes to system specification, operating instructions, maintenance instructions, manuals; work orders for follow up actions.

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	N/A
Revision	2	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.