Title	**Demonstrate knowledge of installation and commissioning procedures for commercial RAC equipment**		
Level	**3**	**Credits**	**8**

Purpose	This is an entry level unit for people working in the refrigeration and air conditioning (RAC) industry. People credited with this unit standard are able to: demonstrate knowledge of pre-installation activities; describe standard practices for installing systems and components; describe system evacuation and charging procedures; describe the records required for a commissioned RAC system.

Classification	Mechanical Engineering > Refrigeration and Air Conditioning

Available grade	Achieved

Guidance Information

1 Recommended skills and knowledge
Unit 28970, *Demonstrate knowledge of the principles of refrigeration and air conditioning,* or demonstrate equivalent knowledge and skills.

2 Legislation and standards
Health and Safety at Work Act 2015;
Building Act 2004 as at Nov 2018;
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
PPE refers to personal protective equipment.
Standard industry practices refer to standard and proven industry practices accepted by the refrigeration and air conditioning industry.

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of pre-installation activities.

Performance criteria

1.1 System and installation information is interpreted from drawings and specifications.

Range system layout, site requirements, schedule of materials, onsite services, component specifications, system performance specifications.

1.2 Modifications to the site that may be required to meet installation and system specifications are described.

Range may include but are not limited to – mounting points, water supply, electricity supply, ventilation requirements.

1.3 Procedures for assembling, and verifying materials and parts against a drawing are described.

1.4 Procedures to verify ancillary onsite service connections and structure, and report any discrepancies are described.

1.5 On site work situations that require permits and/or consents are described in terms of legislative and organisational requirements.

Range may include but is not limited to – hot, cold, confined space, working at height, cranage, lockout tagout.

1.6 The procedures to obtain permits to work and/or consents are described.

Outcome 2

Describe standard practices for installing systems and components.

Performance criteria

2.1 Standard industry practices for installing mechanical equipment are described.

Range mounting and fastening, seismic restraints, bending and joining tubing, torque loadings, soldering, brazing, purging, maintaining internal cleanliness, flow directions, system labelling, leak testing, use of PPE.

2.2 Lubricating oils are described in terms of their function, and compatibility with refrigerants.

2.3 Standard industry practices for installing and checking electrical components are described with reference to electrical regulations.

Range safety procedures, continuity and resistance testing, cable terminations, electrical connections, verifying load and fuse ratings, cabling, using conduits.

Outcome 3

Describe system evacuation and charging procedures.

Performance criteria

3.1 System evacuation is described in terms of the characteristics of vacuums, their measurement, and function in the commissioning process.

3.2 System evacuation procedures are described in terms of standard industry practices.

3.3 The refrigerant charging process is described in terms of standard industry practices.

Outcome 4

Describe the records required for a commissioned RAC system.

Performance criteria

4.1 The records required for assembly and commissioning work are described in terms of their content and purpose.

Range work carried out, time taken, details for costing and invoicing, refrigerant and lubricant used, test results, details required for warranties, system and component operating instructions.

Replacement information	This unit standard, unit standard 28963 and unit standard 29100 replaced unit standard 22702.

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	17 September 2015	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.