

Title	Demonstrate and apply knowledge of variable refrigerant flow and charging refrigerant for VRF system		
Level	4	Credits	7

Purpose	<p>This unit standard covers underpinning principles of variable refrigerant flow units.</p> <p>People credited with this unit standard are able to: demonstrate knowledge of variable refrigerant flow (VRF) system components; and apply knowledge of charging refrigerant for VRF system.</p>
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Classification	Mechanical Engineering > Refrigeration and Air Conditioning
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Available grade	Achieved
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Guidance Information

- 1 Recommended skills and knowledge:
Unit 23959, *Prepare and purge braze piping for refrigeration and air conditioning*, and Unit 28954, *Interpret drawings and produce sketches for refrigeration and air conditioning systems and components*; or demonstrate equivalent knowledge and skills.
- 2 Legislation and standards relevant to this unit standard may include but are not limited to:
Building Act 2004;
Climate Change Response Act 2002;
Electricity Act 1992;
Electricity Amendment Act 1997;
Electricity (Safety) Regulations 2010;
Hazardous Substances and New Organisms Amendment Act 2015;
Health and Safety at Work Act 2015;
Ozone Layer Protection Act 1996;
AS/NZS 5149:2016 *Parts 1:4 Refrigerating Systems and Heat pumps – Safety and environment requirements*;
AS/NZS ISO 817:2016 *Refrigerants – Designation and safety classification*;
and any subsequent amendments.
- 3 References
ASHRAE, 2017 *ASHRAE Handbook - Fundamentals*;
AS 1668.2-2002, *The use of ventilation and air-conditioning in buildings. Part 2 Ventilation design for indoor air contaminant control*;
EECA, *Good practice guide – Heat pump installation (2020)*;
BSRIA AG 1/2001.1, *Pre-commission Cleaning of Pipework Systems*, (4th ed);

BSRIA BG 49/2015 3/89.3, *Commissioning air systems – Application procedures for buildings*;

CIBSE, *Commissioning Code Series A - Air Distribution Systems* (1996);

CIBSE, *Commissioning Code Series C - Automatic Controls* (2001);

CIBSE, *Commissioning Code Series R - Refrigeration Systems* (2002);

HVAC Guide DCP DW/143 Heating & Ventilating Contractors Association (UK), *Guide to good practice ductwork leakage testing. 6th edition.*

- 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.
ASHRAE refers to American Society of Heating, Refrigerating and Air-Conditioning Engineers.
BSRIA refers to Building Services Research and Information Association.
CIBSE refers to Chartered Institution of Building Services Engineers – UK.
EECA refers to Energy efficiency and conservation authority.
Network addressing refers to networking IP addresses of multiple VRF units programming.
Variable refrigerant flow (VRF), also referred to as *variable refrigerant volume (VRV)*, is a technology that circulates only the minimum amount of refrigerant needed during a single heating or cooling period.
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 must be assessed in the workplace using naturally occurring evidence.
 - All activities and evidence must be in accordance with worksite procedures and approved industry practices.
 - Competence is to be demonstrated on at least two occasions of charging refrigerant for variable refrigerant flow systems.
 - Evidence for outcome one must be supported using evidence of VRF training provided from the Heat Pump Suppliers Association (HPSA).

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of VRF system components.

Range system components must include but are not limited to – indoor units, outdoor units, branch controller, twinning kit;
 system types include – heat recovery, heat pump, 2 pipe, 3 pipe, hybrid.

Performance criteria

- 1.1 VRF system components are identified and their functions are described.
- 1.2 Electrical components and controls are identified and their functions are described.
- 1.3 Control systems are described in terms of their purpose and application.
- 1.4 Parts, materials and procedures required to assemble components are identified and verified from drawings and sketches.
- 1.5 VRF system schematics are interpreted, and component locations and characteristics are identified.

Outcome 2

Apply knowledge of charging refrigerant for the VRF system.

Performance criteria

- 2.1 Refrigerant type to be used in the VRF system is identified.
- 2.2 Additional refrigerant charge is calculated according to pipe work schematics and manufacturer's specification.
- 2.3 VRF system is assembled and checked to ensure internal cleanliness of components.
 - Range must include but is not limited to – purging, pressure testing, vacuum proving, general cleaning procedures.
- 2.4 VRF system is charged safely with additional refrigerant and documented.
 - Range type of systems must include but are not limited to – heat pump, heat recovery.

Planned review date	31 December 2026
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Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	26 August 2021	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.