Title	**Commission industrial refrigeration systems**		
Level	**5**	**Credits**	**25**

Purpose	This unit standard is for people who work in the refrigeration and air conditioning sector of the engineering industry. People credited with this unit standard are able to, for industrial refrigeration systems: verify the integrity of systems; evacuate systems; perform pre-start checks; charge and confirm their operation; and complete commissioning activities, check and verify operating manuals, and instruct operators.

Classification	Mechanical Engineering > Refrigeration and Air Conditioning

Available grade	Achieved

Guidance Information

1 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.

2 Reference
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.

3 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.

4 Definitions

Industrial refrigeration systems refer to systems such as: single or multi-staged refrigeration systems (typically using ammonia refrigerant) used in the manufacturing process in areas such as freezing works, breweries, and chemical plants.

Worksite procedures refers 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 Range

Competence is to be demonstrated on three occasions of commissioning industrial refrigeration systems.

Outcomes and performance criteria

Outcome 1

Verify the integrity of 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 – manager, supervisor, contract manager, contractor, internal staff.

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 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 flushed, purged, and verified clean and leak free.

Outcome 2

Evacuate industrial refrigeration systems.

Performance criteria

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

2.2 Refrigerant is recovered and stored in accordance with worksite procedures.

2.3 Vacuums are broken with appropriate refrigerants prior to charging.

Outcome 3

Perform pre-start checks on 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 verified.

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 in accordance with worksite procedures.

Outcome 4

Charge 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 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 in accordance with worksite procedures

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 in accordance with worksite procedures.

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 in accordance with worksite procedures.

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	9 April 1995	N/A
Revision	2	14 April 1997	N/A
Revision	3	5 January 1999	N/A
Revision	4	13 November 2001	N/A
Review	5	20 June 2006	N/A
Revision and Rollover	6	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.