Title	**Interpret drawings and produce sketches for refrigeration and air conditioning systems and components**		
Level	**3**	**Credits**	**3**

Purpose	This is an entry level unit standard for people working in the refrigeration and air conditioning (RAC) industry. People credited with this unit standard are able to interpret refrigeration and air conditioning system drawings and sketches, and produce sketches for refrigeration and air conditioning systems.

Classification	Mechanical Engineering > Refrigeration and Air Conditioning

Available grade	Achieved

Entry information	
Recommended skills and knowledge	Unit standard 2430*, Manually produce and interpret engineering sketches under supervision*, or demonstrate equivalent knowledge and skills.

Explanatory notes

1 Drawings types and symbols used in this standard are as per:
NZS 5902.5:1981, *Building and civil engineering drawing practice – Recommendations for drawings associated with engineering services operating manuals and maintenance manuals.*

2 Definitions
Interpret – explain the meanings, in practical terms, of features shown graphically in the drawing.
Sketches – freehand drawings produced without the aid of guiding instruments.

Outcomes and evidence requirements

Outcome 1

Interpret refrigeration and air conditioning system drawings and sketches.

Range Drawings and sketches cover – ducting, mechanical services layout, tubing and/or piping arrangements, schematics.

Evidence requirements

1.1 Drawing conventions are identified and interpreted.

Range scale, third angle projection, first angle projection, isometric, oblique, sectioning, supplementary views, line conventions, dimensioning, tolerances, symbols, exploded views, title blocks, parts and materials lists, issue date, approval.

1.2 Types of ducts are interpreted from drawings and sketches.

Range round, square, transitions, un-insulated, insulated.

1.3 Components are identified from drawings and sketches, and associated information interpreted.

Range system components may include but are not limited to – cooling towers, air handling units, cooling and heating coils, fans, furnaces, pumps, dampers, filters, compressors, condensers, chillers, thermostats, controllers, sensors, diffusers, evaporators, valves, meters, oil separators, grilles, ducts, air drives, fan coil units, heat exchangers.
Evidence of 15 components is required.
Associated information may include but is not limited to – air flow, fluid flow, flow directions, pressures, component manufacturer's designations.

1.4 Parts, materials and procedures required to manufacture and assemble components are identified and verified from drawings and sketches.

Outcome 2

Produce sketches for refrigeration and air conditioning systems.

Evidence requirements

2.1 Sketches are representative of a working refrigeration and/or air conditioning system.

2.2 Schematics are produced to show major system components and interconnecting tubing.

Range major components – compressor, condenser, receiver, evaporator, control valve.

2.3 Schematics are produced to show minor system components and interconnecting tubing.

Range tubing, access fittings, filter driers, sight glasses, solenoid valves, anti-vibration devices, line heat-exchangers, receivers, pressure regulating valves, check valves, thermostats, switches, controllers.

Evidence of six components is required.

2.4 Sketches are clear and unambiguous to intended users.

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

Consent and Moderation Requirements (CMR) reference	0013

This CMR can be accessed at http://www.nzqa.govt.nz/framework/search/index.do.

Please note
Providers must be granted consent to assess against standards (accredited) by NZQA, before they can report credits from assessment against unit standards or deliver courses of study leading to that assessment.

Industry Training Organisations must be granted consent to assess against standards by NZQA before they can register credits from assessment against unit standards.

Providers and Industry Training Organisations, which have been granted consent and which are assessing against unit standards must engage with the moderation system that applies to those standards.

Requirements for consent to assess and an outline of the moderation system that applies to this standard are outlined in the Consent and Moderation Requirements (CMR). The CMR also includes useful information about special requirements for organisations wishing to develop education and training programmes, such as minimum qualifications for tutors and assessors, and special resource requirements.

Comments on this unit standard

Please contact Competenz at qualifications@competenz.org.nz if you wish to suggest changes to the content of this unit standard.