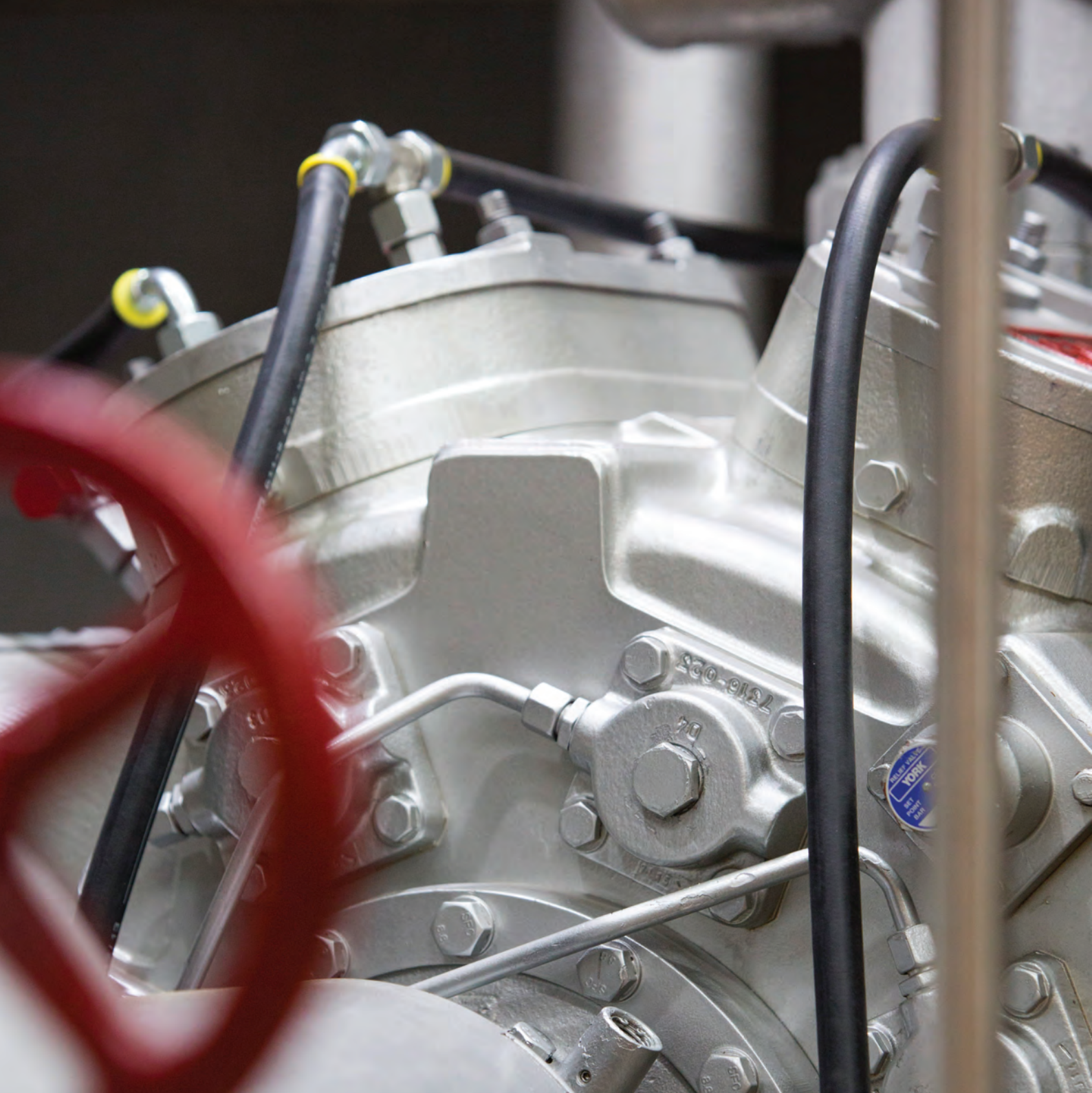




The New Zealand qualifications in refrigeration and air conditioning

Programme handbook for employers and learners

Competenz
SKILLS FOR INDUSTRY



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The New Zealand qualifications in refrigeration and air conditioning (RAC)

Building skills, careers and businesses

If you're reading this booklet, it's likely you're about to make a big decision. You may be a company investing in your people and your business by building skills in the workplace, or an apprentice starting on a career in refrigeration and air conditioning.

In both cases, the New Zealand Certificates in Refrigeration and Air Conditioning (RAC) will help make your decision a wise one. That's because members of your industry have designed these qualifications. They understand the skills employers and employees need to work productively and safely, to keep New Zealand's buildings healthy, safe and pleasant to work in, and to support many industries that contribute to New Zealand's prosperity. They also understand that, as a learner, you're looking to gain skills that will help you build a rewarding career.

The resulting qualifications are flexible, practical and designed with the future in mind. Read on to understand the skills and knowledge these qualifications deliver, the training options available to study towards them, and how Competenz will help you build skills, careers and businesses.



Peter Ferguson
Industry Manager
Competenz



Craig Duff
Director
Active Refrigeration

Competenz thanks the Refrigeration and Air Conditioning Sector Advisory Group and members of the industry who contributed their time and expertise to develop these qualifications.

Representatives from 30 companies, the Climate Control Companies Association (CCCA) and Institute of Heating, Ventilation and Air Conditioning Engineers (IRHACE), and two polytechnics have recommended the structure and content of these qualifications.

About the qualifications and how to work towards them

The purpose of the refrigeration and air conditioning qualifications

These qualifications provide the RAC industry with people who have the multi-disciplinary skills and knowledge needed to work independently to install, maintain, service and commission RAC plant and equipment to industry standards.

RAC plant and equipment includes:

- commercial air conditioning plant found in multi-story buildings
- commercial refrigeration equipment found in supermarkets
- domestic refrigerators
- heat/energy recovery units
- industrial single or multi-staged refrigeration and air conditioning systems
- temperature and environmental control equipment used in the food processing industry
- temperature-controlled transport.

New Zealand Certificates: nationally recognised qualifications

These qualifications are New Zealand Certificates. New Zealand Certificates recognise skills and knowledge that meet nationally agreed standards for achievement. Employers recognise these qualifications because:

- members of your industry have designed and endorsed them;
- the New Zealand Qualifications Authority (NZQA) has approved them and records learners' study towards them.

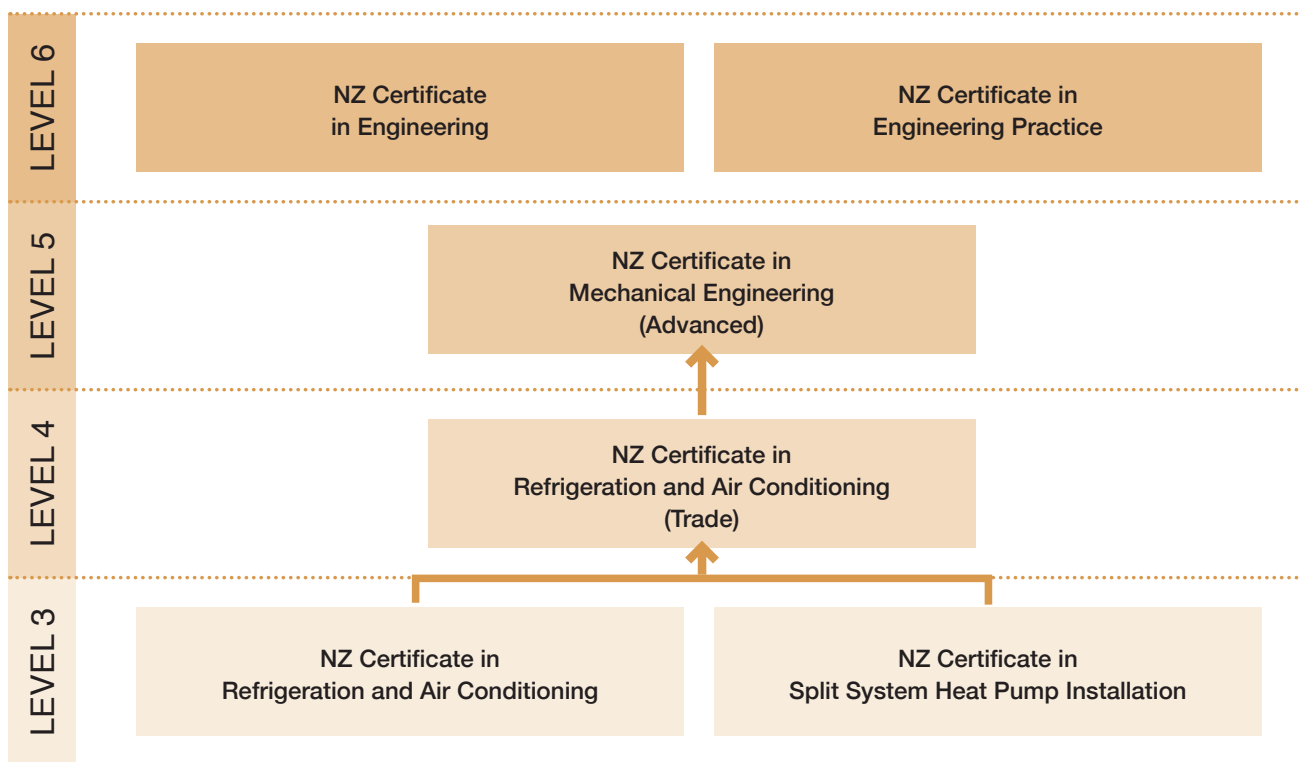
Career opportunities

Graduates will have the skills and knowledge to work as qualified RAC tradespeople, including in specialised parts of the industry. Examples include refrigerated containers, transport, domestic, commercial and industrial refrigeration and air conditioning.



The New Zealand Certificate in Refrigeration and Air Conditioning

How the RAC qualifications work



There are four qualifications. Competenz currently offers training programmes for the level 4 and 5 qualifications.

Qualification	Level	Who this qualification is intended for	Credits awarded	Indicative duration (months)
New Zealand Certificate in Refrigeration and Air Conditioning	3	People entering the industry and wanting to work as trade assistants People already working in the industry as trade assistants and wanting to have their skills formally recognised	120	20
New Zealand Certificate in Split System Heat Pump Installation	3	People who want to install heat pumps	60	12
New Zealand Certificate in Refrigeration and Air Conditioning (Trade)	4	People who want to complete an apprenticeship in RAC	280	48
New Zealand Certificate in Mechanical Engineering (Advanced)	5	Graduate RAC apprentices who want to build advanced technical skills and business skills	70	18

Unit Standards

All the qualifications contain **unit standards**. To complete a qualification, apprentices need to complete the unit standards that make it up. These unit standards specify what learners need to know and be able to do in a range of activities (e.g. demonstrate knowledge of refrigerants and their management).

Credits

When a learner completes a unit standard successfully, they receive credits which Competenz registers on their record of achievement with the NZQA. Each credit represents about ten hours of learning.

About the level 4 apprenticeship qualification and how learners work towards it

To complete the New Zealand Certificate in Refrigeration and Air Conditioning learners need to:

- complete an RAC apprenticeship
- meet the requirements for electrical registration
- meet the requirements for refrigerant filler certification.

On-the-job learning and assessment

Apprentices do most of their learning in the workplace. They receive workbooks to support some of the theory they learn.

Apprentices also receive assessment guides which explain how their on-job learning will be assessed (e.g. the 'evidence' they need to collect to show they have gained the necessary skills). Learners' skills are checked in the workplace by 'verifiers' who have appropriate technical knowledge and skills. Competenz account managers or registered workplace assessors then assess the evidence collected to determine whether the learner has met the required standard.

Off-job learning takes place outside the workplace. It covers theory and practice and takes several forms:

- **Competenz eLearning.** Learners use a computer and internet connection to log into an online portal. Here they receive interactive learning materials to study and complete online tasks. In most cases assessment takes place online.
- **Block courses.** These take place at a polytechnic over a 2 to 3-week period. Apprentices learn how to perform tasks relevant to their qualification under a tutor's instruction. The tutor also assesses their skills.
- **Public courses.** These courses cover the training needed to gain the certificates that lead to an Electrical Workers Registration Board Practising Certificate: the Trainee Limited Certificate (TLC), the Electrical Appliance Serviceperson (EAS), and the Electrical Service Technical (EST). This learning is delivered and assessed by a local training provider.

Funding the apprenticeship training

Competenz receives government funding to keep the fees for apprenticeships manageable.

How Competenz helps learners gain their skills

When apprentices enrol, we assign them a Competenz account manager. Our account managers understand the RAC industry and the skills learners and businesses need to gain. They play a vital role in helping apprentices learn and complete their qualifications in the allocated time.

The training process

1. Signing a training agreement

The apprentice, company and their Competenz account manager sign a training agreement. This agreement outlines what each person or organisation is responsible for during the training. It also makes government funding available to the company to subsidise their apprentice's training and ensures the NZQA records the apprentice's training history.

2. Enrolling apprentices in a training programme

The apprentice, their company and their Competenz account manager agree a training plan that sets out the unit standards the learner needs to complete, and when and how they will do these unit standards. These unit standards specify what learners need to know and be able to do (e.g. select, use and care for engineering hand tools).

3. Supporting apprentices as they work towards their qualification

Apprentices receive learner workbooks, Competenz eLearning and training activities to support the theory they learn. Competenz account managers visit companies to support this learning and review progress. They also arrange the block course training needed.

4. Assessing apprentices' skills

When apprentices enrol they receive assessment guides for their on-job units. These guides explain the 'evidence' they need to gather to show that they have gained the required skills from the jobs they have done. This evidence may include things like photographs, job sheets and drawings.

When learners have gained their skills and are ready to be assessed against a unit standard, their Competenz account manager or a qualified assessor in their workplace completes an assessment and confirms they have met requirements. If the learner is assessed as 'competent', they receive credits and the unit standard appears on their NZQA record of achievement.



Competenz training programme

The apprenticeship training programme for the New Zealand Certificate in Refrigeration and Air Conditioning (Level 4)

Credits: 280 credits

Duration: 48 months (4 years)

Skills and knowledge

All content in the first two years of training is compulsory. Most content in year three is compulsory, but learners have some choice in the unit standards that make up their on-the-job training. All content in the final year is 'elective': apprentices and their employers can choose, from a range of unit standards, the units that are most appropriate to them and their workplace.

Graduates will be able to:

- apply engineering trade skills and knowledge to plan, troubleshoot, recondition, and test when maintaining and servicing a range of RAC plant and equipment
- apply engineering trade skills and knowledge to plan, install, and test a range of RAC equipment in accordance with industry and statutory standards
- commission basic installations and work with specialists to commission the full range of complex plant and equipment
- apply an understanding of the principles of RAC system design and applications to all aspects of their work
- recover refrigerant into a cylinder and charge refrigeration systems in accordance with current regulations
- apply knowledge of the use and management of refrigerants in the RAC industry to safely meet all relevant environmental and industrial legislation
- carry out the electrical work associated with installing, maintaining, servicing and commissioning refrigeration plant and equipment
- apply an understanding of the relevant Health and Safety legislation and workplace safety culture to work safely and meet responsibilities in a commercial environment
- recognise the limits of their ability and the importance of working with integrity and maintaining currency.

How apprentices build their skills

Most learning takes place on-the-job. Competenz eLearning, block courses and public courses supplement this learning off-job. The following table explains the mix of learning activities, by year.

Expected first year

Note: all content is compulsory.

Competenz eLearning

Graduates will be able to...	Unit standard	Level	Credits
Demonstrate knowledge of refrigerants and their effect on the environment.	19666	3	4
Demonstrate basic knowledge of engineering materials	20917	2	2
Demonstrate knowledge of common engineering metals	20799	3	4
Explain the properties of conductors, insulators, and semiconductors and their effect on electrical circuits	25070	2	7
Demonstrate knowledge of electromotive force (EMF) production	25071	2	3
Demonstrate knowledge of electromagnetism theory	25072	2	5

Block Course

Graduates will be able to...	Unit standard	Level	Credits
Demonstrate knowledge of electrical test instruments and take measurements	750	2	2
Demonstrate knowledge of refrigerants and their management	28952	3	5
Demonstrate the knowledge of the principles of refrigeration and air conditioning.	28970	3	15
Shift loads in engineering installation, maintenance, and fabrication work	21913	2	2

Public course

Graduates will be able to...	Unit standard	Level	Credits
Provide first aid	6401	2	1
Provide resuscitation	6402	1	1
Demonstrate knowledge of electrical safety and safe working practices for electrical workers	15851	2	3
Isolate and test low-voltage electrical subcircuits	15852	2	2

On-the-job learning

Graduates will be able to...	Unit standard	Level	Credits
Select, use, and care for, engineering hand tools	2395	2	4
Select, use and maintain portable hand held engineering power tools	2396	2	4
Join metals using the torch brazing and soldering processes	2679	3	6
Demonstrate knowledge of fasteners used in mechanical engineering	21909	2	1
Demonstrate knowledge of safety on engineering worksites	21911	2	2
Apply safe working practices on an engineering worksite	21912	2	2
Demonstrate knowledge of workplace health and safety requirements	497	1	3

Expected second year

Note: all content is compulsory.

Competenz eLearning

Graduates will be able to...	Unit standard	Level	Credits
Demonstrate knowledge of installation and commissioning procedures for commercial RAC equipment	28959	3	8
Demonstrate the knowledge of the principles of commercial RAC system maintenance and servicing	28960	3	8
Demonstrate knowledge of trade calculations and units for mechanical engineering trades	21905	2	6
Demonstrate knowledge of basic mechanics for mechanical engineering trades	21908	2	3
Manually produce and interpret engineering sketches under supervision	2430	2	4
Manually construct plane geometric shapes for engineering	2432	2	3

Block Course

Graduates will be able to...	Unit standard	Level	Credits
Maintain and service commercial RAC systems and equipment under supervision	28965	3	12
Install commercial RAC equipment under supervision.	28963	3	8
Commission commercial RAC equipment under supervision	29100	3	8
Prepare and purge braze piping for refrigeration and air conditioning	23959	3	4
Meet requirements for Approved Filler Test Certificate for refrigerants	28950	3	3

Public course

Graduates will be able to...	Unit standard	Level	Credits
Demonstrate knowledge of theory and legislation for registration of electrical appliance servicepersons	27351	3	3

On-the-job learning

Graduates will be able to...	Unit standard	Level	Credits
Fabricate, assemble and install refrigeration and air conditioning components under supervision	28967	2	6

Expected third year

Most content in year three is compulsory, but learners have some choice in the unit standards that make up their on-the-job training.

Competenz eLearning

Graduates will be able to...	Unit standard	Level	Credits
Demonstrate knowledge of electrical and electronic components used in commercial RAC systems	28961	3	6
Demonstrate knowledge of design principles for commercial RAC systems	28962	4	5
Demonstrate knowledge of legislation and codes that relate to work on RAC systems and mechanical building services	28968	3	5

Block Course

Graduates will be able to...	Unit standard	Level	Credits
Apply knowledge of electrical and electronic components to the installation and maintenance of commercial RAC systems under supervision	28964	3	6
Apply design principles to the design of basic commercial RAC systems	28966	4	5
Diagnose and rectify faults in commercial RAC systems and equipment under supervision	28955	3	8
Demonstrate advanced knowledge of refrigerants and their management	28953	4	5
Interpret drawings and produce sketches for refrigeration and air conditioning systems and components	28954	3	3

Public course

Graduates will be able to...	Unit standard	Level	Credits
Demonstrate knowledge of theory and legislation for registration of electrical service technicians	27349	3	3

On-the-job learning

Learners must complete at least 20 credits from these unit standards:

Graduates will be able to...	Unit standard	Level	Credits
Install commercial refrigeration and/or air conditioning systems	22707	4	20
Modify industrial refrigeration systems	3837	4	20
Install commercial RAC equipment and systems in controlled temperature transport applications	28957	4	20

Expected fourth year

Most content in year three is compulsory, but learners have some choice in the unit standards that make up their on-the-job training.

On-the-job learning

Learners must complete at least 40 credits from these unit standards:

Graduates will be able to...	Unit standard	Level	Credits
Maintain commercial refrigeration and/or air conditioning systems	3846	3	20
Service commercial refrigeration and/or air conditioning systems	3851	4	20
Perform maintenance operations on industrial refrigeration systems	3847	4	20
Service industrial refrigeration systems	3852	4	25
Maintain and service RAC systems and equipment in controlled temperature transport applications	28956	4	20

Learners must complete at least 20 credits from these unit standards:

Graduates will be able to...	Unit standard	Level	Credits
Commission commercial refrigeration and/or air conditioning systems rated below 50 kilowatts	3841	4	20
Commission industrial refrigeration systems	3842	5	25
Commission RAC systems for controlled temperature transport applications	28958	4	20
Commission commercial RAC systems rated above 50 kilowatts	28969	5	25

Pre-requisites and other requirements

There are no entry requirements for the apprenticeship. NCEA level 2 and 3 credits in mathematics, English and science are desirable but not essential.

Apprentices must complete these certificates to gain their Electrical Workers Registration Board Practising Certificate:

- Trainee Limited Certificate (TLC)
- Electrical Appliance Serviceperson (EAS)
- Electrical Service Technical (EST).

Apprentices must also gain their refrigerant filler certification.

Your Competenz account manager can give you more information.

Statement of service

Apprentices need to gain a **Statement of Service** from their employer, confirming that they have completed 6,000 to 8,000 hours of apprenticeship training.

Related qualifications to help learners build their skills

Competenz offers qualifications in related areas like health and safety, management and sales. Please ask your account manager for more information or contact our customer services team.

More information

If your company has a Competenz account manager, please contact them. Alternatively, please call our customer services team on 0800 526 1800 or visit our website: www.competenz.org.nz



About Competenz

Competenz is the industry training organisation (ITO) for the refrigeration and air conditioning industry. We work with businesses and learners across New Zealand to grow skills, careers and businesses.



For more information about Competenz training in refrigeration and air conditioning please contact us:
www.competenz.org.nz 0800 526 1800

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