

# BUILDING SERVICES ENGINEERING: Bringing Buildings to Life



Skilled worker  
careers information – Scotland

From installing a light display for 40,000 people at a music festival, creating unique environmental systems or bringing buildings and homes to life, the opportunities in building services engineering are endless.

In this booklet you'll find out about the wide range of options available to you and the qualifications, skills and qualities you'll need to do them.

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## 01 What is building services engineering?

Building services engineering is hugely important. It has a direct impact on everything we do.

Without it, buildings would be too cold in winter and too hot in summer. There would be no electricity to power our lights and computers; running water would be unheard of; and nipping down to the local shop to grab something for dinner would be impossible as there would be no fridges or freezers – we'd have to buy fresh food every day and eat it in our cold, dark, homes.

### Sounds bleak without it, doesn't it?

Not only is building services engineering vital to the way we live, as a career path it offers hundreds of exciting and challenging opportunities in these industries:

- air conditioning and refrigeration
- electrical installation
- heating and ventilating
- plumbing

It is the job of people working in building services engineering to design, install and maintain the facilities that allow all of us to live and work in comfort and safety.

The sector needs a constant supply of highly skilled and professional people with an environmental conscience, willing to undertake the world-class training and qualifications that are on offer.

But it doesn't stop there: employers make a real commitment to their workforces and spend a lot of time and money on professional development and short courses to teach the skills needed to meet fresh challenges.

There are over 60,000 building services engineering businesses. Between them they employ over half a million people and have an annual turnover of £19.3 billion. They range from multi-million pound companies to small organisations and sole proprietors.

### The sector of the future

Building services engineering never stands still and right now it's taking the lead in environmentally-friendly technology. Climate change is affecting our everyday lives now and it's the people working in building services engineering that are tackling these challenges head-on. As well as designing and installing energy-efficient systems, the sector is at the forefront of developing environmental technology such as solar water heating, photovoltaics or micro-wind turbines to name just a few.



“Building services engineering caught my imagination because there's huge scope to work in all sorts of different areas – even abroad.”

Christopher Jenkins  
Electrical Apprentice, RDM Electrical Services

## 02 Apprenticeships, training, and how to get into building services engineering

As building services engineering has some of the most comprehensive apprenticeships available, you'll be well prepared for your future career within the sector. The main training routes for young people in Scotland are:

- Modern Apprenticeships leading to an SVQ3 at SCQF level 6 or 7 as appropriate

Highly respected by employers, modern apprenticeships are designed to give you the underpinning knowledge and skills you need to work effectively and professionally.

To be employed on most modern apprenticeships you'll need at least four National 5 passes in Maths, English, a Science or Technology subject. Also if you want to join an apprenticeship scheme, you must pass an industry-approved aptitude test before you are eligible to become an apprentice.

### Training

There's a lot to learn. And it takes years to become fully trained. Training includes:

- off-the-job training – such as college or training centre learning, and
- on-the-job training – this is where you apply the skills and knowledge gained at college/training centre while working for your employer.

Generally, training will take between 3 and 4 years to complete, depending upon the apprenticeship scheme you decide to take.

If you are over 20 and looking to change career, building services engineering presents you with the same challenges as a young person. So entering onto the right training course is essential.

You will work towards an SVQ3 at SCQF level 6 or 7, depending on your occupation and job role. To gain an SVQ you must be in employment. You should also be prepared to gain your qualification over a number of years – there's no quick fix to gaining the required qualifications in this highly technical sector.







### 03 What is Air Conditioning and Refrigeration?

From maintaining a comfortable air temperature and humidity in a multi-screen cinema, to keeping blood at the right temperature for lifesaving operations, the air conditioning and refrigeration industry has become a fundamental part of our lives.

Highly skilled and very technical, the industry requires committed and enthusiastic people to install, service and maintain the systems we take for granted.

It’s also an industry that takes its responsibilities to the environment very seriously. As an air conditioning or refrigeration engineer, your technical knowledge and practical skills will ensure that products such as heat pumps and refrigerant gasses are handled in a safe and eco-friendly way, and will reduce the impact on the environment as much as possible.

### Air Conditioning and Refrigeration occupations

Occupation	Key Specialist Activities. You will:	Key Common Activities
Refrigeration engineer	Install, service and maintain refrigeration systems throughout the UK in places such as supermarkets, hospitals, food processing and research establishments	Across both occupations, you will be: <ul style="list-style-type: none"><li>Working safely</li><li>Working in a environmentally friendly manner</li><li>Undertaking preparatory work</li><li>Inspecting, testing, certificating and commissioning</li><li>Identifying and rectifying faults</li><li>Providing functional and technical information</li><li>Maintaining working relationships</li><li>Overseeing work activities</li></ul>
Air conditioning engineer	Install, service and maintain systems and equipment safely which control, and maintain the quality, temperature and humidity of air within modern buildings	



“This is one of the things I love about the job – the variety and the fact that no two days are the same. And when I’m out on-site I feel as if I’m learning all the time.”

Martin Davey  
Refrigeration and Air Conditioning Apprentice, Chilltec Refrigeration

### What qualities and skills do you need?

The air conditioning and refrigeration industry is keen to attract new entrants from a diverse range of backgrounds. The typical qualities and skills required are:

- an aptitude for technical subjects or be practically orientated
  - an interest in technology
  - an ability to solve practical problems
  - motivation to succeed within the industry/sector
  - willingness to learn and apply that learning in the workplace/job role
  - enthusiasm and attitude to work
  - potential to complete the qualifications which are part of the apprenticeship programmes
  - ability to communicate effectively with a range of people
- be numerate and literate
  - have good colour vision to recognise colour coded wires and components
  - ability to work at heights or in confined spaces
  - willingness to undergo a police check (for example when working with children and vulnerable adults)
  - ability to plan and organise the work of others
  - ability to motivate others
  - good analytical skills
  - good evaluation skills

### Qualifications

The table below shows the recognised qualifications for air conditioning and refrigeration and the requirements of the modern apprenticeship framework. The air conditioning and refrigeration industry requires an SVQ Level 3 to achieve qualified operative status.

### Modern Apprenticeship requirements

Competence Qualification:	SVQ Level 3 (SCQF6) in Install, Commission and Maintain Refrigeration Systems or SVQ Level 3 (SCQF6) in Install, Commission and Maintain Air Conditioning Systems
Core skills:	Core skills are embedded in qualifications at SCQF 5
Other Learning:	F-Gas (City & Guilds 2079)

Further information

Industry Organisations:

Building and Engineering Services Association:  
[www.b-es.org](http://www.b-es.org)

Air Conditioning and Refrigeration Industry Board: [www.acrib.org.uk](http://www.acrib.org.uk)

For information on modern apprenticeships in air conditioning and refrigeration contact:

BEST Scotland:  
[www.best-ltd.co.uk](http://www.best-ltd.co.uk) or  
telephone 0131 445 5900



## 04 The Electrotechnical Industry

This is a diverse and exciting industry at the cutting-edge of installing, commissioning and maintaining technology in all types of building, including:

- complex projects such as shopping centres, sports stadiums, hospitals and new housing projects
- computer controlled building management systems
- renewable energy systems, like wind turbines or photovoltaics
- control equipment for complex industrial manufacturing and processing.

The Electrotechnical industry is professional, responsible and future proof. It offers a guaranteed future, a full career path from school-leaver to professional qualifications, and good pay.

From domestic work to major engineering projects – the Electrical world provides a variety of jobs that few others can match. As an Installation Electrician you will have numerous choices about the type of work you do and the career progression route you take.

### Electrical Installation occupation

Occupation	Key Specialist Activities. You will:	Key Common Activities
Installation Electrician	Install power, lighting, fire protection and security systems	<p>You will be:</p> <ul style="list-style-type: none"><li>• Working safely</li><li>• Working in a environmentally friendly manner</li><li>• Undertaking preparatory work</li><li>• Inspecting, testing, certificating and commissioning</li><li>• Identifying and rectifying faults</li><li>• Providing functional and technical information</li><li>• Maintaining working relationships</li><li>• Overseeing work activities</li></ul>

## What qualities and skills do you need?

The electrotechnical industry is keen to attract new entrants from a diverse range of backgrounds. The typical qualities and skills required are:

- an aptitude for technical subjects or be practically orientated
- an interest in technology
- an ability to solve practical problems
- the motivation to succeed within the industry/sector
- a willingness to learn and apply that learning in the workplace/job role
- enthusiasm and a good attitude to work
- the potential to complete the qualifications which are part of the apprenticeship programmes
- an ability to communicate effectively with a range of people
- be numerate and literate
- have good colour vision to recognise colour coded wires and components
- an ability to work at heights or in confined spaces
- a willingness to undergo a police check (for example when working with children and vulnerable adults)

## Qualification

The table below shows the recognised qualification for an installation electrician including the requirements of the modern apprenticeship framework. The electrotechnical industry requires an SVQ3 at SCQF level 7 to achieve qualified electrician status.

### Modern Apprenticeship requirements

Competence Qualification:	SVQ3 in Electrical Installation (GK6J 23) at SCQF level 7
Core Skills:	Core Skills are embedded in the qualification at SCQF 5
Other Learning:	Practical Performance Assessment Level 3

#### Further information

##### Industry Organisations:

The Scottish Joint Industry Board for the Electrical Contracting Industry:  
[www.sjib.org.uk](http://www.sjib.org.uk)

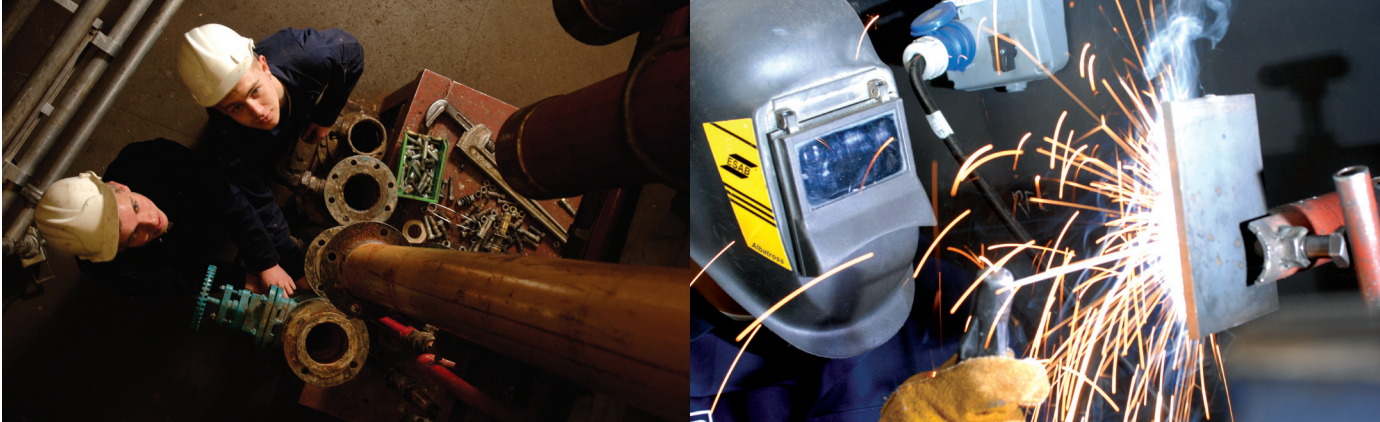
SELECT:  
[www.select.org.uk](http://www.select.org.uk)

Unite the Union:  
[www.unitetheunion.org](http://www.unitetheunion.org)

**For information on modern apprenticeships and adult training schemes in the electrical industry contact:**

Scottish Electrical Charitable Training Trust (SECTT):  
[www.sectt.org.uk](http://www.sectt.org.uk),  
telephone 0131 445 5659





## 05 What is Heating and Ventilating?

From the grilles you can see on a classroom wall, to the large networks of pipes that criss-cross factory ceilings, clues to how buildings work are all around us. Every where we go, whether it's a shop, an office, even a laboratory, we see the precise and complicated systems that make those buildings work.

The heating and ventilating industry installs innovative systems and new technologies such as air and ground source heat pumps to make a building as energy efficient as possible. But this is no easy task: it requires highly trained people who have the ability to adapt and apply their skills to install these complex systems:

- Pipework and ductwork installers use their skills to cut, form, weld, and join a wide range of materials used within a system
- Control and commissioning engineers use their knowledge to ensure systems meet the design requirements for the building
- Maintenance engineers identify faults, fix them and, more importantly, plan and carry out service and maintenance activities on systems, to make sure they work efficiently and effectively.

### Heating & Ventilating occupations

Occupation	Key Specialist Activities. You will:	Key Common Activities
Heating installer	Install complex heating equipment and pipework systems to exact design specifications within large buildings such as office blocks, hospitals, schools etc.	Across all occupations, you will be: <ul style="list-style-type: none"><li>• Working safely</li><li>• Working in a environmentally friendly manner</li><li>• Undertaking preparatory work</li><li>• Inspecting, testing and commissioning</li><li>• Identifying and rectifying faults</li><li>• Providing functional and technical information</li><li>• Maintaining working relationships</li><li>• Overseeing work activities</li></ul>
Ductwork installer	Install complex ductwork and ventilation systems to exact design specifications within large buildings	
Service and maintenance engineer	Develop service and maintenance programs and carry out regular maintenance and repairs on all heating and ventilating systems and equipment	

## What qualities and skills do you need?

The heating and ventilating industry is keen to attract new entrants from a diverse range of backgrounds. The typical qualities and skills required are:

- an aptitude for technical subjects or be practically orientated
- an interest in technology
- an ability to solve practical problems
- motivation to succeed within the industry/sector
- willingness to learn and apply that learning in the workplace/job role
- enthusiasm and a good attitude to work
- potential to complete the qualifications which are part of the apprenticeship programmes
- ability to communicate effectively with a range of people
- be numerate and literate
- have good colour vision to recognise colour coded wires and components
- ability to work at heights or in confined spaces
- willingness to undergo a police check (for example when working with children and vulnerable adults)
- the ability to plan and organise the work of others
- the ability to motivate others
- good analytical skills
- good evaluation skills

## Qualifications

The table below shows the recognised qualifications for heating and ventilation occupations and the requirements of the modern apprenticeship framework. The industry requires an SVQ Level 3 (SCQF6/7) to achieve qualified operative status.

### Modern Apprenticeship requirements

Competence Qualification:	SVQ Level 3 (SCQF6) Heating and Ventilating Industrial and Commercial Installation or SVQ Level 3 (SCQF7) Service, Maintain and Commission Building Engineering Services or SVQ Level 3 (SCQF6) Heating and Ventilating Ductwork Planning & Installation
Core Skills:	Core skills are embedded in qualifications at SCQF 5

Further information

Industry Organisations:

Building and Engineering Services Association:  
[www.b-es.org](http://www.b-es.org)

For information on modern apprenticeships in heating and ventilating contact:

BEST Scotland:  
[www.best-ltd.co.uk](http://www.best-ltd.co.uk) or  
telephone 0131 445 5900



## 06 What is Plumbing?

Imagine you had to light a fire in your home to keep warm. Or washing your hands meant collecting cold water from a well at the end of the street. Sounds silly to us now, but plumbers are responsible for the comfortable, hygienic and safe environments in which we live, work and relax.

Plumbing is a responsive and continually developing industry. In recent years environmental technologies have been integrated within the industry and the modern plumber now undertakes a huge variety of jobs, including:

- installing and maintaining central heating systems, hot and cold water systems and drainage systems
- installing, commissioning and maintaining solar water heating, rainwater harvesting or grey water recycling systems
- installing and maintaining gas, oil and solid fuel appliances.

Plumbing offers you a rewarding future, a full career path leading to professional qualifications, and good pay. No two days are the same – from changing a tap washer to installing a solar powered hot water system, plumbers work on domestic, commercial and industrial projects that offer variety and challenge.

## Plumbing occupations

Occupation	Key Specialist Activities. You will:	Key Common Activities
Plumber SVQ3 (SCQF level 7)	<ul style="list-style-type: none"><li>• Install complex cold water, rainwater, hot water, sanitation, and heating systems and install domestic fuel burning appliances such as gas, oil or solid fuel boilers</li><li>• Design systems</li><li>• Plan work activities</li><li>• Improve business products and services</li></ul>	<p>In addition, you will be:</p> <ul style="list-style-type: none"><li>• Working safely</li><li>• Working in a environmentally friendly manner</li><li>• Undertaking preparatory work</li><li>• Commissioning and decommissioning systems</li><li>• Identifying and rectifying faults</li><li>• Maintaining working relationships</li></ul>

## What qualities and skills do you need?

The plumbing and domestic heating industry is keen to attract new entrants from a diverse range of backgrounds. The typical qualities and skills required are:

- an aptitude for technical subjects or be practically orientated
- an interest in technology
- an ability to solve practical problems
- motivation to succeed within the industry/sector
- willingness to learn and apply that learning in the workplace/job role
- enthusiasm and a good attitude to work
- potential to complete the qualifications which are part of the apprenticeship programmes
- ability to communicate effectively with a range of people
- be numerate and literate
- have good colour vision to recognise colour coded wires and components
- ability to work at heights or in confined spaces
- willingness to undergo a police check (for example when working with children and vulnerable adults)

## Qualifications

The table below shows the recognised qualifications for plumbing occupations and the requirements of the modern apprenticeship framework. The plumbing industry requires the award of an SVQ Level 3 (SCQF7) to achieve qualified plumber status.

## Modern Apprenticeship requirements

Competence Qualification:	SVQ3 in Domestic Plumbing & Heating at SCQF level 7
Core Skills:	Core skills are embedded in qualifications at SCQF 5

### Further information

#### Industry Organisations:

Scottish and Northern Ireland Plumbing Employers' Federation:  
[www.snipef.org](http://www.snipef.org)

Chartered Institute of Plumbing and Heating Engineering:  
[www.ciphe.org.uk](http://www.ciphe.org.uk)

#### For information on modern apprenticeships in plumbing contact:

SNIPEF Training Services:  
[www.becomeaplumber.org](http://www.becomeaplumber.org), telephone 0131 524 1245 or email [training@snipef.org](mailto:training@snipef.org)



“I pride myself on the fact that I’ve never had a complaint about my work and seeing a happy customer gives me a real buzz.”

Alf Ramsay  
Owner, Ramsay Plumbing & Heating





