



# Engineering, Manufacturing and Production

There are a number of highly skilled jobs available in this job family and workers need to be creative and methodical and combine brilliant technical skill with spatial awareness. You may be interested in food production but equally your passion could lie in working with aircraft or marine manufacture. People in these professions share the ability to concentrate for long periods of time and work meticulously on a job to finish it to a high standard. Some will also be highly trained with specialist equipment which may sometimes be hazardous to use so a high level of personal safety awareness is vital.

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## Qualifications and courses

Most entrants are graduates of an aeronautical/aerospace engineering degree although employers may accept those who have gained a bachelor's in other relevant disciplines, such as electrical, mechanical or manufacturing engineering, computer software, physics or maths.

A Bachelor of Engineering degree (BEng) lasts 3 years whilst a Master of Engineering degree (MEng) lasts 4. You will need at least 2 A levels/H grades, including Maths and Physics, and 5 GCSEs/National 5s (A\*-C/A-C) in order to ensure entry onto a degree course. Completing a postgraduate qualification is advantageous, as well as being particularly useful to those whose first degree was in a different subject.

Many companies offer graduate training schemes and some are accredited by professional bodies such as the Royal Aeronautical Society. Your scheme may offer you a placement overseas and the chance to work towards an engineering licence accredited by the Civil Aviation Authority (CAA). Employers often value graduates with prior work experience, therefore completing a voluntary work placement or sandwich placement as part of your degree may improve your employability.

It is possible to enter the industry at a lower level by training as a craft or technician straight from school but you will have to complete further qualifications in order to become an engineer. Apprenticeship schemes offered by airline operators, manufacturers or with a service engineering company usually require good GCSEs/National 5s in English, Maths and Physics. A HNC/HND in Aeronautical or Aerospace Engineering, Avionics, or Air Transport Engineering may improve your chances of employment at technician level.

To enhance opportunities for progression, you may decide to work towards incorporated or chartered status further on in your career whilst undergoing a series of continuing professional development (CPD) courses.

Your oral and written communication skills should be good as you will need to communicate ideas effectively. Teamworking skills are essential but you must also be able to take on responsibility and work independently.

You will be expected to keep up to date with new technology and developments in the industry, and for some roles you will need to have normal colour vision.

## Working conditions

It is usual to work 37–40 hours a week, but this depends a lot on project deadlines and what is currently taking place: hours can be longer.

Work usually takes place in clean quiet laboratories, but visits to production areas are essential and these areas are usually dirty and noisy.

Visits to airfields also take place, where you might be required to inspect and test the functions of the aircraft.

## Future prospects

There are good opportunities for promotion in aerospace engineering with the industry maintaining a strong record of investing in its workforce. The skills you will acquire will make you suitable for higher positions even in other branches of engineering, and many move into consultancy, management or research roles as their career progresses.

Some aerospace engineers work independently as consultants, and others find work abroad for foreign governments or aircraft construction companies. With chartered status, your earnings and responsibilities will increase.

## Advantages/disadvantages

You may have to work long hours, evenings and weekends. Stress levels can also be high if you are trying to meet deadlines.

The starting salary is relatively high, and you can work your way up to a good wage with time and experience.

## Money guide

Starting salaries for graduates tend to range from £20,000 to £26,000 per year.

Depending on your professional status, your earnings will increase to £28,000–£45,000.

Senior engineers might earn in excess of £65,000.

## Related opportunities

- Electrical Engineer p203
- Marine Engineer p215
- Mechanical Engineer p217

## What the work involves

Aerospace engineers research, design and manufacture space vehicles, satellites, missiles and aircraft. You can specialise in mechanical, electrical or electronics engineering, and within these areas you can focus on airframes, hydraulics, materials and structures, or engines.

Your work might involve research, design and manufacture, or experimenting with new materials.

You may also undertake flight test programmes, and maintain and improve fleets of aircraft all over the world.

## Type of person suited to this work

You should have a logical mind and be good at problem solving. You should also be good at maths, and be able to produce good drawings and diagrams, as well as being able to interpret them well.

## Further information

**Institution of Engineering and Technology**  
www.theiet.org

**Royal Aeronautical Society**  
www.aerosociety.com

## Qualifications and courses

There are no formal entry requirements for this line of work. However, GCSEs/National 5s in English, Maths, Design and Technology or equivalent vocational qualifications in engineering/manufacturing are valued by employers.

The most common route of entry is via an apprenticeship where you will undertake a combination of on-the-job training from experienced professionals and a series of day or block release instruction at a college or training centre in order to work for industry recognised qualifications. NVQs/SVQs in Performing Manufacturing Operations (Levels 1 and 2), Performing Engineering Operations (Levels 1 and 2) and Electrical Assembly/Installation (Levels 2 and 3) are available.

As a new recruit you will learn about the company's health and safety policies, welfare and conditions of employment whilst being trained under the supervision of a more experienced colleague in the use of appropriate tools and machinery and the ability to read assembly diagrams. You may also acquire the skills necessary to inspect the quality of finished products and, in the event that new working methods are introduced, you will receive further training.

In order to secure a trainee position within the industry, you may have to undertake an entry test and an interview that will assess your reading and writing skills and your practical aptitude, eg your ability to work quickly and accurately with your hands. Normal colour vision is a requirement for work involving electrical and electronic assembly.

## What the work involves

You will work on an assembly line within a factory or workshop, or at a bench. You could work on products within sectors as diverse as: engineering, furniture production, soft furnishings, domestic electrical equipment, vehicles or electrical circuit boards.

### Assembly line

You will assemble products or components as they arrive at your work area. Sometimes they may not stop, but keep moving along a belt or route in the factory. As the line needs to keep going at a set speed, you will be required to work at the same pace as everyone else.

### Bench

Using hand tools, and in some cases simple machinery, you will carry out specific assembly tasks or create a finished product.

## Type of person suited to this work

You will need to have practical skills and enjoy making or repairing items. In order to construct your product or components, you will have to follow diagrams and instructions and be able to work quickly and precisely.

You need good interpersonal skills and a solid work ethic.

Whilst carrying out repetitive tasks, you must be able to concentrate and maintain a fast pace of work for long periods of time.

## Working conditions

### Assembly line

You can expect to be in a large factory – in some sectors this could be noisy, dirty and busy and in others, such as the electronics industry, it would be clean and dust-free.

Some assembly lines require 24/7 production; if so, you will normally work a shift pattern.

### Bench

You will be sitting or standing using the tools and machinery positioned around you. If you need to use a soldering iron for assembly it can be hot work and may cause fumes. You can also work part time.

## Future prospects

The largest employers of assemblers are the electrical, electronic and information technology industries.

As machines are increasingly replacing some of the assembly work that used to be done by people, jobs are reducing. However, there is still demand for assemblers to work on the assembling of products that are too intricate to be done by machine, or on small batches of goods.

With experience, you may be able to progress into a team leader or supervisory role or within other areas of manufacturing such as quality control. You could also go on to train as an engineering craft worker.

## Advantages/disadvantages

Your surroundings may be dirty and noisy.

Due to advances in technology, the need for workers will continue to drop.

Part-time work is also available, which is attractive to people with families wanting to supplement their income.

## Money guide

Starting salaries for assemblers are around £12,000.

With experience, salaries can range from £13,500 to £17,000.

Very skilled and experienced assemblers in certain parts of the industry, such as automotive assembly, or those with supervisory responsibilities can earn around £20,000 a year.

## Related opportunities

- Food Processing Operative p208
- Mechanical Engineer p217
- Welder p232

## Further information

### Proskills UK

[www.proskills.co.uk](http://www.proskills.co.uk)

### Semta

[www.semta.org.uk](http://www.semta.org.uk)

## Qualifications and courses

One route of entry is via an apprenticeship. As an apprentice you will typically experience a combination of on-the-job training from professionals and a series of day or block release at a college or training centre in order to work towards industry recognised qualifications, such as an NVQ/SVQ in Fabrication and Welding. There are no specific academic qualifications required for entry, however you will need to approach individual employers in order to see if they are willing to take you on as an apprentice. Availability is not always guaranteed and will depend on your local jobs market.

Alternatively, you may opt to complete a full-time college course with a focus on either traditional blacksmithing skills or design. Courses such as a BTEC Level 3 in Blacksmithing and Metalworking may require specific GCSEs/National 5s and forge-work experience. HNDs and degrees in creative aspects of blacksmithing are also available. To gain entry, you will need 2 A levels/3 H grades and 5 GCSEs/National 5s (A\*-C/A-C), an understanding of design and a portfolio of artwork.

Herefordshire and Ludlow College offers a degree in artist blacksmithing and diplomas in blacksmithing and metalwork as well as a Farriery Access course. As contacts are so important in securing work, it may be beneficial to join the British Artist Blacksmiths Association (BABA) in order to attend relevant courses and meet new people. Awards distributed by the Worshipful Company of Blacksmiths are also available.

## What the work involves

You will shape and join metals such as steel, iron, copper and bronze to produce decorative pieces, such as gates and furniture or functional objects for use by companies, such as fire escapes and security screens. You may also restore antique ironwork.

You may create specially commissioned pieces such as a stairway for a building project or specialise in an area such as agricultural engineering or security.

If you specialise in artistic work, you are likely to be self-employed. Your job will therefore include all of the administrative tasks needed to run a business, alongside the general work as a blacksmith. You will have to actively promote your services in order to gain customers and this may involve attending craft shows and fairs.

## Type of person suited to this work

Much of your time will be spent on your feet using different hand tools, often near to the forge which will be very hot. You will need to be very responsible, as the tools and materials that you will be working with can be dangerous.

Having a creative flair will help you to use your materials imaginatively and you will need an understanding of the way products function and how different metal properties will affect the end product.

## Working conditions

You will work with various metals and use different hand and bench tools and a forge. This will result in conditions that can be noisy, dirty and sometimes cramped. You will spend much of the time on your feet and you will wear protective clothing such as gloves, ear protectors and goggles.

You could work in rural areas or in mines, docks and with engineering companies. Artist blacksmiths are less restricted geographically and can be based within both larger cities and rural communities.

## Future prospects

The demand for industrial blacksmiths working in mining sites, docks and engineering is decreasing but, due to an increased interest in decorative metalwork, the skills of artistic blacksmiths are often in demand for commission work.

Working under commission is unreliable and so many blacksmiths are forced to accept other types of work in order to earn a living wage.

Most blacksmiths are self-employed but there are still opportunities for work within small, usually family-run businesses, though positions are very limited in number. With experience, you might progress into supervisory or managerial posts or you may opt to work for a museum or heritage centre.

Entry into trainee positions is competitive and you may need to relocate in order to find one. Future success will rely on your ability to build a reputation.

## Advantages/disadvantages

Much of the work is done alone and can be isolating.

The work is tiring, but when you have created what a customer requires it can be satisfying too.

If you are involved in a creative project such as a commissioned sculpture, it can be very rewarding.

## Money guide

Starting salaries generally range from £12,000 to £16,000 a year.

Once training has been completed you could earn in excess of £25,000.

Earnings tend to vary as most blacksmiths, being self-employed, are free to negotiate their own rates.

## Related opportunities

- Bricklayer p60
- Farrier p247
- Sheet Metal Worker p226

## Further information

**British Artist Blacksmiths Association**  
[www.baba.org.uk](http://www.baba.org.uk)

**British Farriers and Blacksmiths Association**  
[www.forgemagazine.co.uk](http://www.forgemagazine.co.uk)

**Worshipful Company of Blacksmiths**  
[www.blacksmithscompany.org](http://www.blacksmithscompany.org)

### Qualifications and courses

There are no set entry requirements for this career. GCSEs/National 5s in English, Maths and a science may be useful though, particularly when seeking work. Employers often value those with qualifications when promoting workers to supervisory and management positions. Sometimes it is possible to enter the industry in a related area such as in a manufacturing, processing or packaging operations environment, whilst later progressing to the role of brewery worker.

Alternatively, there may be an apprenticeship available in your area in food manufacturing which leads to this career. Apprenticeships typically involve a combination of on-the-job training and assessments from experienced professionals covering all stages of the beer-making process, with a series of day or block release instruction at a college or training centre in order to gain industry recognised qualifications. NVQs/SVQs Levels 1–3 in Food Manufacture are usually the qualifications trainee brewery workers work towards achieving. It may be helpful to complete the NVQ Level 3 in Food Manufacture if you wish to progress to a supervisory post.

Brewing Research International (BRI) offers the opportunity to progress into the more technical side of the industry, although this requires you to be educated to degree level. The Institute of Brewing and Distilling also offers courses, such as the General Certificate, Fundamentals or Diplomas in Brewing, Distilling and Packaging.

### What the work involves

You will make and package beer, stout and lager for a variety of outlets including shops and pubs.

You could be involved in the whole beer making process or just certain stages.

You will work as part of a team supervised by a technical brewer. Your jobs will include weighing and mixing ingredients, monitoring quality, labelling and packing the product and loading the beer ready for dispatch.

### Type of person suited to this work

You will need to enjoy working in a team, and be aware of the health and safety regulations to keep yourself and others safe at work.

The work is quite physically demanding; you will be lifting and operating heavy machinery so will need to be fit and healthy.

Good numeracy skills will be helpful when measuring out ingredients and checking the amount of products produced.

### Working conditions

Most large breweries have a shift system in place for their workers. You will usually work around 40 hours a week, and can work overtime if necessary.

You will be working with machinery and fermenting ingredients, therefore overalls, gloves and goggles may be worn to limit contamination and to keep you safe.

You will have to work through all weather conditions, loading products and unloading raw materials.

### Future prospects

Due to the increasing usage of machinery and automated processes in the mass production of beer and the decline in the number of large breweries in the UK, there are fewer industry vacancies available to brewery workers.

However, there has been a significant rise in micro-breweries producing craft beer in the last few years which has created over 900 jobs in 2013 alone, due to a large change in consumer behaviour. With 1,147 micro-breweries in operation in the UK, you may find yourself working for a more specialised employer, in a supervisory or management role, or opening your own once you have specialist training and gained technical brewing status.

### Advantages/disadvantages

Due to the decline in multinational brewing companies across the UK, it can be difficult to find work and many smaller micro-breweries are family run, employing very few staff with limited promotional opportunities.

Working in a brewery can be smelly, hot and physically demanding; this may be stressful or tiring at times. However, working in a team of other brewery workers creates a lively and fun atmosphere.

Making beer, stout and lager is a satisfying job role as you know you are creating beverages that people enjoy drinking.

### Money guide

The amount you earn does depend on the location and size of the brewery you work for.

Average starting salaries can be up to £15,000, with this rising to £22,000 with a few years' experience.

Senior brewery workers or those in supervisory roles may earn in excess of £29,000.

Those working within a shift system may get a shift allowance.

### Related opportunities

- Cellar Technician p122
- Craft Technical Brewer p202
- Food Processing Operative p208

### Further information

**Campaign for Real Ale (CAMRA)**  
[www.camra.org.uk](http://www.camra.org.uk)

**Campden Brewing Research International**  
[www.campdenbri.co.uk/brewing-services.php](http://www.campdenbri.co.uk/brewing-services.php)

**Institute of Brewing and Distilling**  
[www.ibd.org.uk](http://www.ibd.org.uk)

## Qualifications and courses

One route of entry into this industry is to begin as a trainee technician, developing your skills via an Advanced Apprenticeship in Engineering Manufacture (Craft and Technician). The Engineering Construction Industry Training Board (ECITB) offers a 3-year apprenticeship for design and draught technicians.

As an apprentice, you will typically experience a combination of on-the-job training from skilled professionals and a period of day or block release instruction at a college or training centre. You are likely to work for industry-recognised qualifications; the actual subjects you study will depend on your employer's business. They may include an NVQ Level 1 and 2 in Performing Engineering Operations, an NVQ Level 2 and 3 in Engineering Technical Support, a City & Guilds Certificate or BTEC Certificates/Diplomas. Applicants for an apprenticeship will require 4 GCSEs/National 5s (A\*-C/A-C) or equivalent including Maths and science or technology.

Alternatively, you may opt to study relevant pre-entry qualifications at college, such as the City & Guilds Awards and Certificates in Computer-Aided Design and Manufacturing (Levels 1-3), the City & Guilds Award in Computer-Aided Design and Parametric Modelling (Levels 1-3), the BTEC Certificate/Diploma in Engineering (Levels 2-3) or the BTEC Level 3 Certificate/Diploma in Mechanical, Manufacturing or Civil Engineering.

Upon completion of your training, CAD draughtspeople are encouraged to seek engineering technician (EngTech) registration with the Engineering Council UK in order to improve your career prospects. As technology changes, you should update your skills throughout your career through a series of continuing professional development (CPD). Employers may offer you the chance to gain further qualifications such as HNCs/HNDs or training in your company's specific software.

## What the work involves

You will produce the drawings and instructions that will enable others to create structures, equipment or components.

Using a computer-aided design (CAD) workstation you will draw up technical drawings for components or sections of a structure, or for different products.

Depending on the specialism of the company you work for, you may design part of a structure as large as a factory or bridge, or a component as small as an electronic circuit.

## Type of person suited to this work

You should be patient, accurate and have a good understanding of different production processes.

You need to be organised and methodical in your work and able to work to tight deadlines.

Good IT, technical drawing and numerical skills are essential.

You will need to be able to solve design problems in a creative way and you should be comfortable communicating your work to others.

## Working conditions

Most of your work will be done sitting in front of your computer or drawing board in an office or design area.

You will work normal office hours but you might need to work overtime when deadlines are close.

Sometimes you will visit the shop floor or factory area where the product you are designing is being made and conditions could be noisy, hot and dirty. However, your own workspace will be quiet as a lot of concentration is required.

## Future prospects

All construction and manufacturing companies across the UK need trained draughtspeople which means they are in constant demand, however, your job prospects may also depend on the economic state and the fluctuating nature of the construction and manufacturing industries.

You may work within fields including aeronautical, civil, electrical, mechanical and marine engineering companies, central and local government and public utilities.

You can progress to senior, supervisory and team-leader work and with further qualifications you could become an architect or a chartered engineer. There are also opportunities to work abroad or work freelance.

## Advantages/disadvantages

As much of your work involves using your drawing board or computer, your eyes could get tired and strained.

If you want to progress, you can move to supervisor level within your own company or elsewhere.

With experience, it may be possible to work on a freelance basis, being contracted by smaller companies who do not employ their own draughtsperson.

## Money guide

Starting salaries are typically between £15,000 and £20,000 per year.

With experience, you can expect to earn £23,000-£30,000.

High earners employed at a senior level can achieve up to £40,000.

## Related opportunities

- Architectural Technician p57
- Architectural Technologist p58
- Graphic Designer p161

## Further information

### Chartered Institute of Architectural Technologists

[www.ciat.org.uk](http://www.ciat.org.uk)

### Tomorrow's Engineers

[www.tomorrowsengineers.org.uk](http://www.tomorrowsengineers.org.uk)

## Qualifications and courses

Ideally you should gain an Institution of Chemical Engineers (IChemE) accredited degree or postgraduate qualification in chemical, biochemical or process engineering. Other relevant degree subjects such as chemistry, polymer science, environmental or nuclear engineering may be considered, but an accredited postgraduate qualification, such as an MSc in Process Engineering, will significantly improve your chances of both employment and chartered status further on in your career.

HNDs in similar subjects are also considered although you may have to start your career as a technician and work up to the position of chemical engineer as you gain further qualifications. You will need a minimum of 3 A levels/H grades and 5 GCSEs/National 5s (A\*-C/A-C), including English, Maths and a science, in order to gain a place on an engineering or related degree/HND course.

Entry without a degree or HND is uncommon, although you may be able to secure an Apprenticeship in Engineering, which could lead to a role as an engineering technician, providing you with the opportunity to study for a relevant degree.

Many companies offer graduates internal training programmes, some of which are IChemE certified. These Accredited Company Training Schemes (ACTS) ensure graduates become competent professional engineers whilst covering the requirements of chartered status. Employers are placing increasing value on candidates with appropriate work experience, thus, carrying out voluntary work may enhance your employability.

Chemical engineers need to commit to a programme of continuing professional development (CPD) to make sure their skills are kept up to date throughout their career.

## What the work involves

You will devise low-cost, safe and environmentally friendly methods that will transform raw materials into products such as fuel, pharmaceuticals, plastics and toiletries.

You might research ways to improve the future of our planet which could include discovering renewable energy sources or producing replacement human organs.

You might work in manufacturing and help to design and construct plants for mass production of products. You will then oversee the running of the plant and the quality of its products.

## Type of person suited to this work

You will need to have good oral and written communication skills in order to brief colleagues and compile extensive reports from research you have undertaken. Project management skills are also very important.

An analytical mind and the ability to problem-solve are helpful when designing and testing products or equipment in the plant itself.

You will also need to be creative in order to come up with cost-effective products and solutions to problems.

An aptitude and interest in chemistry are also recommended, as is a good understanding of engineering and maths.

## Working conditions

Working hours are normally standard office hours from Monday to Friday, although you might have to work overtime on occasion (including evenings and weekends), particularly if you are developing a new product.

You will usually work in a plant, laboratory or research establishment so conditions can vary from peaceful, sterile labs to noisier factory floors.

You might need to wear appropriate safety equipment for certain aspects of the job.

## Future prospects

Jobs are available across the UK in a range of industries, from pharmaceuticals to oil and gas.

Opportunities for progression and promotion are good; you could obtain a position in senior management or a project leader role.

Chemical engineers are encouraged to achieve chartered or incorporated status.

## Advantages/disadvantages

You will continue to learn new skills and gain qualifications throughout your career.

You will have the opportunity to work in a range of industries and possibly abroad.

Some of the conditions that you work in could be distracting or challenging.

## Money guide

Salaries are likely to vary according to the sector, size and location of the industry in which you work, however a typical graduate starting salary is around £28,000.

Experienced engineers can expect to earn £50,000 a year.

Senior chemical engineers with chartered status can achieve in excess of £60,000.

## Related opportunities

- Environmental Engineer p207
- Manufacturing/Production Engineer p213
- Mechanical Engineer p217

## Further information

**British Chemical Engineering Contractors Association**  
www.bceca.org.uk

**Institution of Chemical Engineers**  
www.icheme.org

**Semta**  
www.semta.org.uk

## Qualifications and courses

Trainee technical brewers are usually required to have a degree or postgraduate qualification. Heriot-Watt University offers a specialist degree in brewing and distilling through their International Centre for Brewing and Distilling (ICBD) but other subjects such as food studies, chemical and mechanical engineering and biology will also provide you with some of the relevant skills required in the industry. Entry requirements for a degree are typically 2 A levels/H grades and 5 GCSEs/National 5s. Those whose first degree is not related to the field of brewing may benefit from completing a postgraduate qualification in brewing science or biotechnology.

Alternatively, you could begin your career as a brewery worker or production assistant before progressing to technical brewing roles by gaining further qualifications as you train. Usually a number of GCSEs/National 5s grades are needed to be accepted onto an Apprenticeship in Food Manufacturing.

After completion of your degree, graduate training schemes may be offered by some of the larger brewery companies but competition is fierce. You may find pre-entry experience, eg work placements or shadowing opportunities in a brewing environment, advantageous as employers often look for candidates who can demonstrate a familiarity with technical language, teamwork skills, management experience and a logical approach.

Once employed, you are likely to undergo a series of continuing professional development (CPD) programmes in order to update your skills and qualifications. The Institute of Brewing and Distilling offers a range of courses for general brewing and specialist subjects; these include a general certificate in brewing, distilling and packaging, a diploma in brewing modules and master brewing modules.

## What the work involves

You will be overseeing the whole brewing process, managing the brewery workers and monitoring the condition of the brewing equipment.

Technical brewers are responsible for checking the quality of raw materials and testing the product regularly for texture, taste and appearance.

In a large brewery you may specialise in a certain area of brewing, such as fermentation, packaging or quality control, whereas in a small brewery you are likely to be involved with all aspects of the brewing process.

You will be responsible for developing new brewing methods, and designing and developing new beers, stouts and lagers.

## Type of person suited to this work

You will need to be scientific, with an enquiring mind and a particular interest in biochemistry. Both a practical ability and an interest in engineering are also useful.

Leadership and interpersonal skills are needed as you will be managing a team of brewers. Good communication skills are

also needed as you will be responsible for writing reports, keeping records and presenting new brewery methods to your colleagues.

## Working conditions

As brewing is a continuous process, you will work shifts including nights and weekends. Usually you will work no more than 40 hours a week.

Some technical brewers will need to be on their feet all day, checking the brewing process, in hot and noisy conditions.

Some time will be spent in an office organising paperwork and making reports on production, stock quality and budgets.

## Future prospects

The number of large breweries in the UK is in decline and the increased use of machinery and automated processes means that competition for positions will be high. The majority of available industry jobs are concentrated around the east of England, the London area, Glasgow and Aberdeen.

With experience you can progress to managerial roles and senior brewer positions in a large brewery, such as a head brewer or technical director where you will lead a team of specialist staff. Alternatively, you could move into related areas such as research and development, quality control, distribution, sales or personnel.

The number of UK micro-breweries and market demand for craft beer have risen dramatically in the last few years and diversified the opportunities available for craft technical brewers. You could work within a very small, specialised team or open your own micro-brewery.

## Advantages/disadvantages

This is an interesting and diverse role, which can lead to good promotions and self-employment.

Working night shifts in a hot and smelly environment may be tiring and stressful.

## Money guide

Starting salaries are generally between £17,000 and £24,000 per year.

With experience this is likely to increase to £25,000–£33,000.

Senior brewers may earn in excess of £40,000.

## Related opportunities

- Biotechnologist p483
- Brewery Worker p199
- Cellar Technician p122

## Further information

### Campaign for Real Ale (CAMRA)

[www.camra.org.uk](http://www.camra.org.uk)

### Campden Brewing Research International

[www.campdenbri.co.uk/brewing-services.php](http://www.campdenbri.co.uk/brewing-services.php)

### Institute of Brewing and Distilling

[www.ibd.org.uk](http://www.ibd.org.uk)



### Qualifications and courses

You will need a degree or postgraduate qualification in a subject such as electrical or electronic engineering, mechanical engineering, applied physics or computer science. For degree entry you will need at least 2 A levels/H grades and 5 GCSEs/National 5s (A\*-C/A-C) including Maths and a science. Relevant HNDs or Foundation degrees, in Electrical, Mechanical or Building Services Engineering for example, may also be considered, although employers often place value on those who have studied at degree level. Some universities may offer those diplomates with relevant work experience the opportunity to accelerate into the final year of a degree programme.

Alternatively, you could enter the field at a lower level by first training as an electrical engineering technician and working your way up by gaining experience and higher qualifications. Advanced Apprenticeships in Engineering Manufacture (Craft and Technician) or the Higher Level Apprenticeship in Engineering Manufacture (Senior Technician) are available. You will need good GCSEs/National 5s (A\*-C/A-C) in English, Maths, a science or technology in order to be considered. You will need to study for a degree, however, if you wish to become a professional electrical engineer.

Many companies offer graduates training schemes post-university. Programmes vary according to the size of the company but typically involve a series of on-the-job training and structured continuing professional development (CPD). Undertaking work experience or a vacation placement will benefit your application as employers often like to see evidence of a candidate's enthusiasm, ability to work in a team and commercial awareness.

Those with a bachelor's degree in engineering (BEng) or equivalent can apply for incorporated engineer (IEng) status via the Engineering Council and those who have studied to master's level can gain chartered engineer (CEng) status further on in their career.

### What the work involves

Electrical engineers research, design and develop a range of electrical equipment. You will be making, testing and servicing all types of electrical equipment and machinery, and as such you will be involved in projects from conception to completion.

You will usually work on projects with a team of professionals, including contractors and engineers from other industries.

You will also be liaising with clients and contractors about the development of each project, which will involve preparing reports and giving presentations.

### Type of person suited to this work

You should have excellent mathematical ability and a very analytical mind in order to successfully design and develop complicated new electrical systems. A logical approach to problem solving is also beneficial.

You will need good communication skills, both oral and written, for working alongside team members and clients. This will involve explaining and talking through projects, as well as compiling written reports and leading presentations.

You must have normal colour vision and natural manual dexterity.

### Working conditions

Although electrical engineers usually work within the normal working week, you may find that you need to work additional or unsocial hours in order to solve problems and meet project deadlines.

Your time will be divided between office-based and on-site work. You can expect to travel on a daily basis so a driving licence is useful.

Conditions on-site can often be dirty, cramped and potentially hazardous so you should be prepared to get your hands dirty and wear safety equipment.

### Future prospects

There are no set pathways of career progression for electrical engineers and many decide to stay in a purely engineering role for the duration of their working life.

Alternatively, there are possibilities to move into project management, become a consultant or take on a more managerial role within a company.

### Advantages/disadvantages

Your work will be undertaken at a variety of indoor and outdoor locations so you will not be confined to an office environment.

You will play an instrumental role in developing new and increasingly safe electrical equipment for a variety of important functions.

Hours can be long and unpredictable, especially when nearing completion of a project.

### Money guide

The starting salary for a graduate electrical engineer can range from £20,000 to £25,000.

Experienced or incorporated engineers are likely to earn £28,000-£38,000 a year, with chartered engineers usually receiving a salary of £40,000-£55,000 or more.

Some companies offer excellent benefit packages and bonus schemes in addition to a basic wage.

### Related opportunities

- Civil/Construction Engineer/Civil Engineering Technician p69
- Mechanical Engineer p217
- Telecommunications Engineer p228

### Further information

**Institution of Engineering and Technology**  
www.theiet.org

### Qualifications and courses

The most common route of entry into a career as an electricity distribution worker is via an apprenticeship, for example the Advanced Apprenticeship in Engineering Manufacture (Craft and Technician) may be available. Although there are no set qualifications required to gain access to a training scheme, most employers seek a minimum of 4 GCSEs/National 5s (A\*-C/A-C) including English, Maths and a related subject such as a science, Design and Technology or Engineering.

Apprenticeships are open to those aged 16–24 and typically take 4 years in which to become fully qualified. You are likely to undertake a combination of on-the-job practical training from experienced professionals and college-based instruction where you will work towards achieving industry recognised qualifications, such as a City & Guilds NVQ in Electrical Power Engineering (Levels 2 and 3) with options in overhead lines or underground cables or the BTEC Level 3 Certificate/Diploma in Electrical/Electronic Engineering. Short courses in areas such as high voltage safety are also possible options to further your career.

On completion of your training, you could work towards becoming a registered engineering technician (EngTech) with the Engineering Council, which will improve your earning potential and career prospects. Appropriate qualifications, 3 years' experience, membership of the Institution of Mechanical Engineers (IMechE) or the Institution of Engineering and Technology (IET) and a professional review are required.

As proof of your competency working on-site, your employer may need you to be registered in an appropriate safety passport scheme.

### What the work involves

Electrical distribution workers are responsible for installing, checking and maintaining all machinery and equipment that supplies electricity to commercial and residential properties. You will be working on a variety of projects from small-scale domestic problems to regional electrical concerns.

You will be working on the overhead lines, masts and underground cables that run from power stations and connect all the electricity networks together.

You could work as a cable jointer who mainly works on the underground cables, an overhead line worker or an electrical fitter who installs, tests and repairs equipment in the regional electricity substations.

### Type of person suited to this work

You will need to be practical and good with your hands as you will be using a variety of tools and undertaking fiddly tasks. You must have normal colour vision and pay meticulous attention to detail.

You should be reasonably fit with a head for heights, as some jobs may require lifting and carrying heavy equipment or working high above the ground.

Since you will be working with live electricity, you must be aware of your own safety and that of others around you. You may need to wear protective equipment at times.

### Working conditions

Although you will usually work an average of 37 hours a week, these may involve shift patterns including evenings and weekends. You should also expect to work overtime on occasion in order to complete projects on time.

The work can be physically demanding as you will be bending and carrying large cables and equipment. You may work outdoors in damp and muddy trenches and you can expect to be carrying out tasks in cramped conditions sometimes.

### Future prospects

As an electricity distribution worker, you will have various options available as you progress in your career. You may go on to become a supervisor or manager and be responsible for a team of workers. Alternatively, you could move into another related job within the industry.

Your career prospects could be improved by studying for additional qualifications as you work, such as an NVQ Level 4 in Electrical Engineering, or even a relevant degree.

### Advantages/disadvantages

You will be on-site for the majority of your time so you will not be confined to an office environment.

Possibilities for career progression or diversification are good.

Conditions can be unpleasant owing to extreme weather or space constraints.

You may have to work irregular/unsocial hours.

### Money guide

Apprentices typically earn between £11,000 and £15,000 per year, depending on the stage of their training.

You can expect your salary to increase to between £20,000 and £45,000 a year, depending on your qualifications and experience.

### Related opportunities

- Electrical Engineer p203
- Electrician p78
- Gas Network Engineer p210

### Further information

**Engineering Council UK**  
[www.engc.org.uk](http://www.engc.org.uk)

**Institution of Engineering and Technology**  
[www.theiet.org](http://www.theiet.org)

### Qualifications and courses

This career is open to graduates of a relevant accredited engineering degree, such as environmental, petroleum, electrical, mechanical or chemical engineering as well as other science-related subjects such as chemistry, physics or earth science. Due to an increase in profile and application of renewable and sustainable energy solutions, a number of specialist degrees have become increasingly available, such as energy engineering, sustainable energy and climate science.

Entry requirements for engineering or related degrees are a minimum of 2 A levels/3 H grades and 5 GCSEs/ National 5s (A\*-C/A-C) including English, Maths and a science. Alternative entry qualifications may include relevant BTEC Diplomas or Access courses.

For those with non-accredited degrees, you will need to complete a postgraduate conversion course in renewable energy engineering, sustainable energy systems or energy futures, in order to upgrade your qualifications. A postgraduate course in engineering may be beneficial to all candidates however, as this will enhance your career prospects and support your pathway to gaining chartered status.

Graduate training programmes are available to those post-university. Most entrants for schemes within the larger oil companies will have gained a 2.1 in their degree subject, but postgraduate qualifications are generally preferred. Experience is also valued by employers so work placements may be worthwhile in a somewhat competitive jobs market.

Becoming a member of relevant organisations will also ensure you remain up to date with the latest developments in the industry, allow you to make essential contacts and inform you of new training courses. To improve your prospects further, you could work towards gaining chartered status via the Institution of Engineering and Technology (IET).

### What the work involves

You will be involved with the extraction of oil and gas and the production of energy from renewable or sustainable sources, such as wind power, solar power or biofuels.

You will have to calculate how much oil or gas a well will produce and decide how to extract as much as possible and also oversee the drilling operations on an offshore rig.

You could also have to research new ways of generating energy, whilst developing ways of improving existing processes.

### Type of person suited to this work

Excellent communication and interpersonal skills are needed for teamwork and to build strong relationships with other professionals and clients.

You should have a high level of numeracy and good IT skills, as well as scientific understanding of related fields such as geology and chemistry.

You will need to have excellent planning, organisational and problem-solving skills to successfully run a project.

### Working conditions

If you become involved with power plant or drilling operations, you could work on a 7-day shift system, which would include nights and weekends, whereas working in design, research and development will mean working more standard office hours.

The work is both mentally and physically demanding and conditions on-site are often noisy, wet, cold and inhospitable.

Some jobs may involve international travel and long stays away from home.

### Future prospects

The renewable energy industry is rapidly expanding, due to an increased interest in environmental issues, the rise in demand for oil and gas and the pressure on businesses to reduce their carbon footprint.

Renewable and sustainable energy has become a government priority and so job prospects for energy engineers are very good with growth areas including corporate social responsibility (CSR), teaching roles and positions in research and development.

You could be employed in the oil and gas industry, energy production companies or you could move into the education field by teaching or conducting university research.

With experience, you could move into planning, policy development, or freelance consultancy.

### Advantages/disadvantages

Oil drilling in particular operates in some of the most dangerous and hostile areas of the world, so your safety could be threatened on a daily basis.

It will be rewarding to know that you have helped to minimise environmental damage.

You will have to be prepared to spend some time away from home.

### Money guide

Salaries for graduates typically range from £20,000 to £30,000, with the larger earnings coming from the big oil companies.

Those with experience or in senior management roles could earn between £35,000 and £80,000.

### Related opportunities

- Civil/Construction Engineer/Civil Engineering Technician p69
- Environmental Engineer p207
- Mechanical Engineer p217

### Further information

**Engineering Council UK**  
[www.engc.org.uk](http://www.engc.org.uk)

**Oil Careers**  
[www.oilcareers.com](http://www.oilcareers.com)

## Qualifications and courses

The most common route of entry into this career is via an Advanced Apprenticeship in Engineering Manufacture (Craft and Technician). Most employers require candidates to have 5 GCSEs/National 5s (A\*-C/A-C) in subjects including, English, maths, a science and either technology or Engineering. Employers value candidates who have shown demonstrable interest within the engineering field, by either completing work experience in the sector, carrying out a 14-19 Young Apprenticeship in Engineering or Manufacturing or completing the Intermediate Level Apprenticeship in Engineering Manufacture.

As part of the selection process, you may be required to complete basic literacy, numeracy, communication skills and spatial awareness tests and an interview prior to being accepted.

As an apprentice, you will undertake several months of training away from the workplace to develop specialist skills. You will then spend 2-3 years working for a company whilst also attending college and studying towards relevant professional qualifications. There are several possible pathways leading to careers in different areas of the field, such as fabrication and welding, electronics, aerospace or marine engineering, therefore the qualifications you study will be vital in determining your chosen pathway. These qualifications could include the BTEC Level 2 Certificate/Diploma in Engineering, the NVQ/SVQ in Mechanical Manufacturing Engineering (Levels 2-3), the BTEC Level 3 Certificate/Diploma in Mechanical Engineering or Manufacturing Engineering or the City & Guilds Certificate/Diploma in Engineering. More specialist qualifications such as an NVQ/SVQ in either Engineering Woodworking, Pattern and Model Making, Marine Engineering or Toolmaking (all Level 3) may be encouraged by your employer.

## What the work involves

Engineering machinists make engineered parts from various materials, such as metals or heavy and lightweight plastics. You could make parts for a variety of products, from domestic appliances and machines to wind turbines and aeroplane engines.

You will be using a range of machinery, including grinding and cutting machines, drills and presses. Increasingly, computer numerically controlled (CNC) machinery is being used which combines some of the manufacturing processes.

You will need to interpret complicated engineering drawings in order to assess which materials, tools and machines to use to produce each part.

## Type of person suited to this work

You will need to have good eyesight, excellent coordination and sound practical ability in order to operate machinery safely and accurately.

Good mathematical skills and the ability to read complicated engineering drawings and interpret them into a 3D part are essential.

You should have strong communication skills as you will mainly be working in a team environment. A good level of physical fitness is also beneficial as the job involves lifting heavy materials and standing or bending over machinery for the majority of the day.

## Working conditions

Working hours are usually around 38 hours a week, Monday to Friday, although you will usually start early in the morning and finish early in the afternoon.

Some larger companies operate 24-hour production and would require you to work shifts including evenings and weekends. Conditions in factories and workshops are usually fairly pleasant, although it can be noisy at times.

As you are operating machinery, you will need to wear appropriate safety equipment at all times.

## Future prospects

Job prospects are good as there is currently a shortage of skilled machinists in the engineering sector. There are jobs available for machinists throughout Britain, although the majority are found in larger cities and within general mechanical engineering companies. You could work in mechanical engineering, automotive or aerospace industries or within shipbuilding.

With experience, you could be promoted to team leader or supervisor and if you gain further qualifications you could move into engineering technician roles such as design.

## Advantages/disadvantages

Jobs are available throughout the UK and there is little travelling involved so you will rarely be absent from home.

It is a physically demanding role, with large amounts of time spent standing or bending over machinery and lifting heavy materials and equipment.

You may have to work unsocial hours owing to early starts or unpredictable shift patterns.

## Money guide

Starting salaries for trainees are usually between £12,000 and £15,000.

With experience, your earnings can rise to £17,000-£25,000.

Those employed in a senior position with supervisory responsibilities can achieve up to £30,000 a year.

## Related opportunities

- Motor Vehicle Technician p218
- Sheet Metal Worker p226
- Toolmaker p230

## Further information

**Semta**

[www.semta.org.uk](http://www.semta.org.uk)

## Qualifications and courses

Most employers require candidates to have a good degree, usually a 2.1 minimum, or postgraduate qualification in a relevant subject such as civil or environmental engineering. You will need at least 2 A levels/H grades and 5 GCSEs/National 5s (A\*-C/A-C), including Maths and Physics, for degree entry. You may be considered if you have studied another engineering subject, or something related such as physics, applied physics or maths but the field is highly competitive and you may have to supplement your degree with a postgraduate qualification. Candidates are encouraged to complete a master's degree as this will be beneficial further on in your career when seeking chartered status.

Alternatively, it may be possible to enter the field with an HND in a relevant subject such as general engineering, civil engineering, environmental engineering, applied physics or computing and IT. As some employers prefer graduates, supplementing your HND with work experience is highly recommended.

Some companies offer a sponsorship scheme for candidates who have completed their A levels/H grades. This sponsorship consists of financial support to the candidate throughout their degree programme and the offer of an apprenticeship upon graduation.

Many employers offer graduates opportunities to enter structured graduate development programmes once in employment. With the training and supervision of senior mentors, graduates will work towards becoming professional engineers of either incorporated (IEng) or chartered (CEng) status or becoming specialists in their individual fields.

## What the work involves

Environmental engineers work on projects concerning waste management, land reclamation and pollution control, and liaise with a variety of clients from local authorities to private property developers.

You will visit and assess numerous sites in relation to their environmental impact, and will explain your findings to clients via presentations and reports.

You may also communicate the environmental issues of a project or site to the general public, green groups and regulatory authorities.

## Type of person suited to this work

You should have excellent mathematical ability and a very analytical mind in order to successfully carry out complicated procedures and calculations to assess sites and projects. A swift and logical approach to problem solving is also needed when dealing with often unforeseen environmental complications.

Good oral and written communication skills are essential for working alongside team members and clients.

Negotiation skills are also helpful as you might need to reach compromises over projects with local government officials, residents or clients.

## Working conditions

You will usually work 35–40 hours from Monday to Friday, although additional or unsocial hours are not uncommon should problems occur or if deadlines need to be met on a project.

Your time will be divided between office-based and on-site work, so you can expect to travel on a daily basis. A driving licence is essential.

You will work in all weather conditions on-site, so should be prepared to get cold and muddy. You will also have to adhere to site safety regulations and wear relevant protective clothing.

## Future prospects

As environmental concerns become an increasingly important aspect of construction projects across the globe, there are good prospects and opportunities within this field for career progression.

With experience, you could move into consultancy and set up your own firm. Alternatively, you could specialise in an area such as treatment of industrial waste, or provision of drinking water in developing countries.

You could work in a small company, or in much larger multinational firms. There are also numerous opportunities to work on projects abroad.

## Advantages/disadvantages

You will be responsible for minimising the environmental impact of building projects and protecting the wellbeing of the natural surroundings, which will be rewarding.

Working on potentially controversial developments could lead to confrontations with local residents or clients.

There are excellent opportunities to work overseas, or set up your own company.

## Money guide

The starting salary for an environmental engineer can range from £17,000 to £25,000.

With a few years' experience, you can expect to earn anything up to £55,000 a year.

Senior environmental engineers with chartered or incorporated status could earn £90,000.

## Related opportunities

- Environmental Health Practitioner/Officer p22
- Marine Engineer p215
- Mechanical Engineer p217

## Further information

**Chartered Institution of Water and Environmental Management**

[www.ciwem.org](http://www.ciwem.org)

**Engineering Council UK**

[www.engc.org.uk](http://www.engc.org.uk)

### Qualifications and courses

There are no set qualifications required for this profession though some employers may ask for basic levels of literacy and numeracy and, depending on the shift patterns and machinery involved, some employers will require employees to be at least 18 years of age.

A common route of entry into the industry is via an Apprenticeship in Food Manufacture. Apprenticeships are structured training schemes that typically combine on-the-job training with a series of day or block release instruction at a college or training centre where you will work towards gaining industry-recognised qualifications. Depending on the area of the sector in which you work, your employer may encourage you to work towards awards such as an NVQ/SVQ in Food and Drink Manufacturing Operations (Levels 1–4), an NVQ/SVQ in Chemical, Pharmaceutical and Petrochemical Manufacture (Levels 1–4) or a BTEC Level 3 Certificate/Diploma in Food Science and Manufacturing Technology. Practical skills as well as general health and safety with food will be taught.

With time, you can work towards progressing to a management role or supervisory position. In order to do this, you might need GCSEs/National 5s (A\*–C/A–C) in English, Maths, a science or Food Technology in order to be considered later on in your career. At an operative level, you can choose to move to different areas of food production, such as baking, freezing or brewing.

### What the work involves

Food processing operatives can be involved in one of many areas of food processing. These include freezing, canning, baking, drying, cooking, chilling, pasteurising or a combination of several of these processes.

Since much of the work above is carried out by machines, you may be involved in operating the machinery and you might also be expected to carry out basic maintenance on it.

You might be involved in the production of the food, for example placing different components of foodstuffs in containers. Packaging and labelling are other tasks that you might be required to carry out.

### Type of person suited to this work

It is helpful if you have an interest in food and food processing.

You should be good at working in a team, and be able to respond quickly to problems that may arise. You need to be able to stay alert and perceptive at all times, even if tasks are mundane or boring. A good ability to concentrate and observe what is going on around you will really help with this.

Good literacy and numeracy skills are also essential, and you will need to be able to follow instructions easily, both written and spoken. A thorough understanding of health and safety requirements is also an advantage.

### Working conditions

You will be working in a factory environment most of the time. This will involve standing in a production line, as well as bending and lifting. Temperature in the factory varies according to the processes taking place.

You will almost certainly be required to wear protective clothing, such as overalls and hats, and a high level of personal hygiene is essential.

You can expect to work 37 to 40 hours a week, usually on a shift system which may include weekends. Overtime is often available.

### Future prospects

The food and drink manufacturing industry is extremely large, employing more than 500,000 workers in over 30,000 companies. The sector is currently set to expand, thus there are good job prospects for food processing operatives.

Many industries are now shifting to automated processes, higher value products and niche markets, such as organic food production and processing, therefore, if you hold qualifications or specific technical skills, you will maintain a distinct advantage.

Progression within the food and drink industry is relatively common and, if committed, you stand a good chance of moving up in your company or moving on to others. You can progress to supervisory and management positions quite quickly and opportunities for work within quality control roles are common. Most managers in this sector started out as a food processing operative or something similar.

### Advantages/disadvantages

The working environment may not always be pleasant: it can be very hot or very cold. Work may be mundane at times, and the salary is not very high.

There are usually plenty of jobs available in this sector, and prospects for promotion are good. If you work your way up jobs become more interesting and better paid.

### Money guide

Salaries typically start at £11,900 per year.

This can rise to £16,500 as you gain experience.

Supervisors and managers can earn in excess of £18,000.

### Related opportunities

- Brewery Worker p199
- Food Safety Officer p125
- Meat Process Worker p216

### Further information

**Food and Drink Federation**  
[www.fdf.org.uk](http://www.fdf.org.uk)

**Improve Ltd**  
[www.improveltd.co.uk](http://www.improveltd.co.uk)

**Scottish Food and Drink Federation**  
[www.sfdf.org.uk](http://www.sfdf.org.uk)

### Qualifications and courses

Most employers do not require furniture manufacturing operatives to hold any specific academic or vocational qualifications, but a number of GCSEs/National 5s (A\*-C/A-C) may be valued and could support you in your search for employment. You may need to pass an eyesight and colour vision test in order to be considered for work.

The most common route of entry into this industry is via an Apprenticeship in Wood Making or Making and Installing Furniture. As an apprentice, you will typically experience a combination of on-the-job training from professionals in a furniture manufacturing or other relevant company, and a series of day or block release instruction at a college or training centre where you will work towards gaining industry recognised qualifications.

Awards such as a City & Guilds Certificate in Furniture Production (Levels 1-3) or an NVQ/SVQ Level 1 in Supporting the Production of Furniture and Furnishings, a Level 2 in Making and Installing Furniture, a Level 3 in either Making and Repairing Hand-Crafted Furniture and Furnishings or Making and Installing Production Furniture, and a SQA HNC in Furniture Construction and Design may also be available.

### What the work involves

Furniture manufacturers construct pieces of furniture; they may either use machinery, or construct furniture by hand.

This involves cutting and shaping individual parts of each piece, then assembling them to make a finished item. You may then have to smooth and finish items, getting them ready for sale.

You will usually then be asked to add handles and hinges, and sometimes to upholster the furniture too.

### Type of person suited to this work

You must be practical and good with your hands.

You should also have excellent eyesight and full colour vision. Hand-to-eye coordination is a must.

Some jobs will also require artistic ability. You must be accurate, careful, and above all patient.

Your physical strength should be reasonably good, as you will need to lift and carry things.

You must be able to take orders, and work under supervision. It is also important to be able to work in a team.

Tasks may become repetitive, but you need to be able to stay focused at all times.

### Working conditions

You will be working in a factory, so the environment may be noisy. Most jobs require you to stand in a production line all day, and the air may be dusty and smell strongly of the products used to treat finished furniture.

Protective clothing is usually worn, including ear protectors and face masks for many jobs. Many jobs involve standing for long periods, lifting heavy weights, and bending.

It is normal to work a 39 hour week. Shift work might be required and overtime is common during seasonal peaks or when the factory has a delivery deadline.

### Future prospects

The furniture manufacturing industry currently employs around 150,000 workers within 7,600 businesses, alongside a further 12,000 related companies offering opportunities for operatives to work across the UK. You may have to relocate to areas where companies are more concentrated, for example in the major UK cities, the Midlands, the north-west of England, Edinburgh and Aberdeen.

With the increased mechanisation and use of technology, employees with good IT skills who can operate specialist machinery and understand complex systems, are rapidly replacing the need for those workers with physical strength.

Promotion is a possibility, and many manufacturers move into more senior roles within companies, managing projects and gaining responsibility. Others choose to specialise in specific areas of furniture manufacture, for example furniture restoration, craft cabinet making or even furniture design.

More furniture manufacturers are now choosing to teach their craft or set up their own business by becoming self-employed.

### Advantages/disadvantages

If you are interested in your craft and willing to put a little time in, a career in furniture manufacture can really grow, and so can your salary.

This job can be satisfying if you enjoy building and making things and are good at DIY.

Working on constructing the same item over and over again can get repetitive.

### Money guide

Most operatives start on a salary of around £12,000 per year.

With experience, this might increase to £15,000.

If you become highly skilled, you can expect to earn in excess of £25,000.

### Related opportunities

- Carpenter/Joiner p65
- Ergonomist p24
- Shopfitter p105

### Further information

**Association of Master Upholsterers and Soft Furnishers**  
www.upholsterers.co.uk

**British Furniture Manufacturers**  
www.bfm.org.uk

**British Woodworking Federation**  
www.bwf.org.uk

## Qualifications and courses

The most common route of entry into a career as a gas network engineer is via an apprenticeship. There are no formal qualifications required for traineeships but a good standard of education would be expected. For entry you will need a minimum of 4 GCSEs/National 5s (A\*-C/A-C), in Maths, a science, English and a practical technical subject such as Engineering or Design and Technology.

Once employed in a company as an apprentice, you will experience a combination of on-the-job training from professional engineers and a series of day or block release instruction at a college or training centre where you will work towards achieving industry-recognised qualifications. NVQs in Gas Network Operations (Mains Laying, Service Laying or Craft) (Levels 1-3) and an NVQ Level 3 in Gas Emergency Service Operations are some of the qualifications available to study. These awards are often undertaken on a progressive basis, meaning the more experience and skills which you develop, the more equipped you are to gain the higher level qualifications.

After completing an NVQ Level 3, it is possible to apply for a HND/degree or higher level NVQs. Graduate engineering and management training schemes are also available. It is also possible to undertake a 3-year National Grid Advanced Apprenticeship.

Employers will consider it necessary for you to have a safety passport from an appropriate industry scheme, with Energy and Utility Skills for example, in order to demonstrate your competency working on-site.

## What the work involves

Gas is transported from its supply points (called beaches) to domestic and industrial customers by a network of pipes and meters that will be your responsibility to fit and maintain.

To gain access to pipework you will probably need to dig a hole in a road, garden or pavement. This can be a physically demanding job. You will be using digging and excavating tools and pipe-laying equipment.

You will be responsible for the safety of yourself and others when carrying out work. This will include putting up warning signs, barriers and traffic control if needed. You may have to deal with emergency gas leaks.

## Type of person suited to this work

You will normally work in a small team, so you should enjoy working with and be able to get on with people. You will be meeting new customers each day, so being polite and courteous are also important skills.

An ability to follow instructions and an understanding of technical language and drawings is essential as these will be used to tell you what you need to do on a daily basis.

When the job is complete, you will have to ensure the finished surface is safe and as good as it was when you started, so you should be tidy and efficient.

## Working conditions

You will be working in a team outdoors in all weathers. You will normally work 37-40 hours a week; overtime and weekend work will be expected on a rota basis.

You will be using equipment which can be physically demanding and you will get dirty. As this can be dangerous work you will wear protective clothing such as high-visibility and fireproof clothing, steel toe-capped boots and headgear.

## Future prospects

The National Grid coordinates and monitors the gas distribution network in the UK. There are 4 gas distribution companies: National Grid Distribution, Wales and West Utilities, Northern Gas Networks and Scotia Gas Networks (operating in the south of England as Southern Gas and in Scotland as Scotland Gas Networks).

There is currently a high demand for gas network engineers due to both an extensive 30-year pipeline replacement programme and an ageing workforce, particularly in the north of England. You could find work in one of the regional gas distribution companies, for a utility contractor or a construction company building new developments.

With experience and training, you could progress from craftsperson status to a technician, team-leader or management position where you would be responsible for managing a number of teams.

## Advantages/disadvantages

You will be working outside in all weathers.

You may have to deal with complaints from angry customers about holes in their road.

Giving the public a gas supply for their homes and businesses can be rewarding.

## Money guide

Whilst training, workers can earn around £11,000 per year.

With qualifications and experience this can rise to £18,000-£25,000 per year.

As a team leader or with more responsibility you can expect your salary to increase to £25,000-£32,000 per year.

## Related opportunities

- Construction Operative p72
- Construction Plant Operator p73
- Water/Sewerage Network Operative p116

## Further information

### Energy & Utility Skills

[www.euskills.co.uk](http://www.euskills.co.uk)

### Energy & Utility Skills Register

[www.eusr.co.uk](http://www.eusr.co.uk)

### Northern Gas Networks

[www.northerngasnetworks.co.uk](http://www.northerngasnetworks.co.uk)

### Scotland Gas Networks

[www.sgn.co.uk](http://www.sgn.co.uk)



## Qualifications and courses

This career is open to all graduates with a degree in engineering and specific degree qualifications in subjects such as agricultural engineering, environmental engineering, electrical engineering, ergonomics, off-road vehicle design or mechanical engineering may improve your chances. HNDs in similar subjects are also considered for entry level, technician, positions and some employers may be willing to support further study to take you to degree level. You will need a minimum of 2 A levels/3 H grades and 5 GCSEs/National 5s (A\*-C/A-C) including English, Maths and a science, for degree entry.

Your degree or HND must be accredited by the Institution of Agricultural Engineers (IAgrE), or a similar licensed body of the Engineering Council, if you would like to progress to incorporated (IEng) or chartered (CEng) engineer status. Those with an accredited bachelor's degree or HND are eligible for IEng status and those who have studied to master's level can pursue CEng status. These qualifications will significantly enhance your career prospects and earning potential.

For those looking to work as a technician, the Intermediate or Advanced Apprenticeship in Land-based Engineering may be available. However, if you wish to become a fully qualified engineer, you will need to study for a degree.

Some larger organisations may offer graduate training schemes post-university. When seeking employment as a graduate, you will be at a distinct advantage if you have had some pre-entry experience within the field as employers often look for candidates who can show evidence of teamwork, an ability to record and analyse data and an understanding of equipment. Some university courses may include a year of paid, practical work experience.

## What the work involves

Land-based engineers design, develop, test and modify agricultural and horticultural equipment in order to ensure that these industries stay up to date.

You will need to carry out extensive research into the needs of those using the equipment you are producing, as well as assessing and limiting the environmental impact of your projects.

You will also be required to compile reports, present your findings and offer expert advice to colleagues, clients and other professionals.

## Type of person suited to this work

You will need great ingenuity in order to find solutions to problems or design new equipment to aid agricultural and horticultural processes.

Excellent communication skills are required to understand the needs of your clients and translate them into designs and instructions for your team.

Good IT skills, problem-solving abilities and a flexible approach to work are also essential in order to cope with the various demands of differing projects.

## Working conditions

You will usually work a normal working week, although occasional overtime may be necessary to meet project deadlines.

Although you will be office based for the majority of the time, there will be some work on-site and fieldwork so that you can assess projects and carry out tests on equipment.

You may find that you have to work outdoors in unpredictable weather or cold, wet and muddy conditions. You will also need to wear relevant safety equipment whilst on-site.

## Future prospects

There are opportunities for land-based engineers to work all over the world, undertaking a variety of projects from food production in the UK, dealing with natural disasters and war, to creating effective water supplies in areas of the developing world. There is currently a national shortage of professional engineers; therefore, job prospects are good.

Larger firms offer greater scope for career progression and you could soon be managing your own projects. You could specialise in design or testing and development where it is also possible to become self-employed. Alternatively, you could move into sales and marketing or even research and teaching. Smaller firms offer less opportunity for progression, so you might have to move to another company to develop in your field.

## Advantages/disadvantages

Each day will present new problems and challenges so the work will always be interesting and stimulating.

You will be working with a variety of people from many professional sectors and areas of the community.

On average, you will earn less than engineers in other industries.

## Money guide

Starting salaries are usually between £19,000 and £25,000.

Once you have gained 10–15 years' experience, you could expect earnings in the range of £35,000–£50,000.

Chartered land-based engineers can earn in excess of £60,000.

## Related opportunities

- Agricultural Scientist p235
- Environmental Engineer p207
- Land/Geomatic Surveyor p92

## Further information

**British Agricultural and Garden Machinery Association**  
www.bagma.com

**Engineering Council UK**  
www.engc.org.uk

## Qualifications and courses

There are no specific educational requirements but most applicants will be expected to hold GCSEs/National 5s (A\*-C/A-C) in English, Maths and preferably a practical subject such as craft or technology.

There are no formal apprenticeship schemes for locksmithing but you may be able to enter the industry as a trainee within a company. Candidates are advised to approach local locksmiths and ask if there are any trainee positions available. The 'Find a Locksmith' database on the Master Locksmiths Association (MLA)'s website is a useful resource. As a trainee, you would receive on-the-job instruction from experienced professionals and you may also be offered the chance to develop your skills by completing short courses accredited by the MLA.

Alternatively, the MLA, the recognised authoritative body for locksmithing, offers a General Locksmithing Course at their training centre in Northamptonshire. As part of this course, candidates will study industry recognised qualifications such as the City & Guilds Award in Basic Locksmithing. To apply for training you must be a member of the British Locksmiths Institute (BLI). Individuals over the age of 16 can apply for student membership without any prior experience. Advanced Student membership is for those who have 12 months' practical training in locksmithing and have passed the entry exam.

An NVQ in Providing Security, Emergency and Alarm Systems (Levels 2 and 3) and City & Guilds vocational courses in security and alarm systems are also available.

## What the work involves

You will sell, install and fix the locks of houses, cars and businesses for your customers.

You will use specialist machinery to cut replacement keys for locks.

Advising on, repairing and installing security and closed-circuit television systems may be part of your job.

## Type of person suited to this work

As a locksmith you will have to be calm and patient – reassuring your customers, who may be distressed, whilst providing a prompt and reliable service. Good communication skills are important in this job.

Your customers and employer will also expect you to be totally trustworthy and honest.

To do this job you will have to enjoy using your hands, different tools and equipment. You should enjoy practical tasks and be able to offer solutions to security problems. Carpentry or general engineering skills are also helpful.

## Working conditions

Employers include independent small locksmiths, larger national companies offering a 24-hour call-out emergency

service, specialist security companies, DIY hardware stores and shoe repairers that offer a key-cutting service.

If you work in a shop you will probably have a 40-hour, Monday–Saturday week. Self-employment is possible.

If you or your employer offer a 24-hour call-out service, you could be working at all times of the day or night.

You will mainly operate from a van that holds your tools so a driving licence is essential.

## Future prospects

Progression for locksmiths is mainly achieved by becoming self-employed and building up a profitable business.

It is also possible to progress into more specialist areas of work such as safe engineering.

## Advantages/disadvantages

This can be a varied job as your work and location will change with each customer.

You will have the opportunity to meet many people and have the satisfaction of helping them.

Working unsocial hours/during the night can affect your personal life.

Call-outs to replace locks after burglaries can be distressing.

## Money guide

Trainee locksmiths can expect a starting salary of about £13,000.

As you gain experience, you could achieve earnings of £14,000–£25,000 and over.

You will usually receive bonuses or higher rates for emergency call-outs.

Self-employed locksmiths establish their own rates based upon their company's success and reputation.

Earnings can vary with geographical location.

## Related opportunities

- Carpenter/Joiner p65
- Glazier p87
- Shoe Repairer p469

## Further information

**Master Locksmiths Association**  
[www.locksmiths.co.uk](http://www.locksmiths.co.uk)

**Skills for Security**  
[www.skillsforsecurity.org.uk](http://www.skillsforsecurity.org.uk)

## Qualifications and courses

The most common entry route is with a relevant degree in an engineering subject. For degree entry, you will need 2 A levels/3 H grades (including Maths and Physics) and 5 GCSEs/National 5s (A\*-C/A-C). It is becoming increasingly common for candidates to obtain a master's degree as this will be benefit you when seeking chartered engineering (CEng) status further on in your career. HNDs in similar subjects are also considered by employers, but you will have to undertake further study towards degree level qualifications whilst working.

It is recommended that your degree be accredited by the Engineering Council as this will make the process of gaining incorporated (IEng) or chartered (CEng) engineering status quicker. The most direct way to reach incorporated engineer (IEng) status is through obtaining a relevant degree, but it can also be achieved through a HNC or Foundation degree in Engineering or an appropriate NVQ Level 4 or SVQ Level 4 qualification. A postgraduate qualification or an MEng is required in order to become a chartered engineer.

You may be able to secure a graduate training scheme or in-house training programme, post-university. These offer recently qualified engineers the opportunity to gain experience within several departments of a company whilst working towards professional engineering status. When seeking work, academic qualifications are not always considered essential, but you must be able to show good problem-solving and project management skills, leadership, an ability to work to deadlines and have an awareness of health and safety issues in the workplace. Work experience within the manufacturing industry will improve your chances of gaining employment.

## What the work involves

Manufacturing engineers design, implement and maintain manufacturing processes. You will be consulting with other professionals, such as design engineers, in order to produce high quality products efficiently and with minimum cost.

You could work in a variety of industries, including food and drink, fashion, and pharmaceuticals. You could work widely across a project, from design and research to after-sales care. Therefore, you will be using a variety of manufacturing equipment and computer systems on a daily basis.

## Type of person suited to this work

You should be able to work as part of a team, as you will be liaising with other professionals on a daily basis to discuss product ideas and manufacturing solutions.

You should be good at analysing and solving problems in order to understand and stay ahead of potential manufacturing issues. The ability to prioritise your workload is also beneficial. Strong numerical skills are essential.

## Working conditions

You will usually work 37 hours a week, but this often includes evening and weekend work. Extra or unsocial hours can be

expected when a new production process is being tested, or if the company you are working for operates a shift system.

You will divide your time between office-based work, meetings and time spent on the shop floor or in the factory. When on the shop floor, you might have to wear safety equipment or protective clothing.

## Future prospects

It is encouraged that you join your relevant professional body, dependent on your specialism, once you have qualified.

These include the Institution of Mechanical Engineers (IMechE) and the Institution of Chemical Engineers (IChemE). This also lets you keep your training up to date through the continuing professional development (CPD) courses many of them run. You could work in a variety of manufacturing sectors, building diverse experience that will help you move across industries and sectors within manufacturing, taking up managerial or marketing roles.

Alternatively, you could specialise in a certain area (such as pharmaceuticals or clothing) and move into production management or consultancy; here you would draw upon your knowledge and experience to motivate and advise others.

There are also numerous short-term contracts available for manufacturing engineers, which would allow you to become self-employed.

## Advantages/disadvantages

Manufacturing engineers enjoy one of the most creative roles in the engineering sector, with great input into product design and final function.

If you work in a large company, there may be opportunities to travel.

You may work evenings and weekends on a regular basis.

## Money guide

The average graduate starting salaries, on completion of initial training, range from £24,000 to £28,000.

With 5–10 years' experience, you could earn up to £40,000.

Senior manufacturing engineers can expect to earn £40,000–£60,000.

## Related opportunities

- Electrical Engineer p203
- Mechanical Engineer p217
- Textile Operative p229

## Further information

### Institution of Engineering and Technology

[www.theiet.org](http://www.theiet.org)

### Institution of Mechanical Engineers

[www.imeche.org](http://www.imeche.org)

### Semta

[www.semta.org.uk](http://www.semta.org.uk)

## Qualifications and courses

Many employers ask for GCSEs/National 5s (A\*-C/A-C) in English, Maths, a science and another related subject, such as Engineering or Design and Technology. Sometimes employers will ask for further qualifications, or even require candidates to complete an aptitude test.

The most common route of entry into a career as a marine craftsperson is via an apprenticeship within a firm of shipbuilders, repairers or boat builders. As an apprentice, you will undertake a combination of on-the-job training from experienced marine craftspeople with a series of day or block release classroom-based instruction, which most employers will be willing to fund. Training usually begins with health and safety regulations and an induction course, followed by basic skills including selecting materials, interpreting drawings and how to use relevant tools, before practising and furthering your abilities by working towards industry recognised qualifications.

Possible boat-building courses that may be available to you include an NVQ Level 3 in Engineering Maintenance, in Marine Engineering (Levels 2-3), Level 2 in Boat Production and Support Services and a City & Guilds Certificate/Diploma in Marine Construction, Systems Engineering and Maintenance (Levels 2-3). You could also take a specialist degree in Leisure Boat Design and Construction.

Alternatively, you could develop your skills by studying general engineering college courses full time. Some colleges situated in coastal, boatbuilding areas may run introductory courses in marine crafts. BTEC Certificates/Diplomas in Mechanical, Electrical or Electronic Engineering are available, as are higher-level qualifications, such as HNCs/HNDs in Marine Engineering. Experience working in other related craft industries, such as welding, plumbing or joinery, may also support you in your search for employment.

## What the work involves

A marine craftsperson takes part in the building and repair of many different kinds of ships and boats.

Repairers and shipbuilders work with big vessels such as ferries, dredgers, tugs, submarines, tankers and warships. Boat builders work with smaller boats, such as wooden dinghies, sailing boats, narrow boats and powerboats.

Both crafts require you to work from a design to create the ship or boat. This has usually been created on a computer, and you work at marking and cutting out shapes, welding, and cutting and bending steel and other materials.

## Type of person suited to this work

You should be a good teamworker, and a good communicator.

A practical, logical and problem-solving mindset is essential, as you will not only be required to interpret drawings and plans but will also need to solve problems on the job quickly and intelligently.

You should also be good with numbers, and have good eyesight and good physical fitness.

## Working conditions

Marine craftspeople tend to work a normal 37-hour week, but overtime is usually available. Some urgent repair jobs may take place overnight and during weekends, but this is relatively rare.

Working at heights is normal, and you will probably spend the majority of your time indoors.

## Future prospects

Opportunities for boatbuilding and repair work are more likely to be found in coastal areas, therefore you may have to relocate in order to secure employment. Work in shipyards, building larger vessels is found in Scotland, Northern Ireland and the north of England.

As you gain experience, it may be possible to progress to a position such as supervisor or inspector. You could also work towards becoming workshop manager.

Another option is to use your experience to become self-employed in areas such as boat building and repair.

Some people choose to gain further qualifications and become a marine engineering technician, move into marine design or specialise in equipment sales and support. You may even opt to transfer your skills into the wider engineering or construction industries.

## Advantages/disadvantages

If you have an interest in practical work and building things, and in ships and maritime matters, then this job can be really enjoyable. It can be really satisfying to create something you are passionate about.

The dirty working conditions might not sit well with everybody, so if you want to work in a clean and tidy environment your skills may be better suited elsewhere.

## Money guide

Starting salaries range from around £13,000 to £17,000 per year.

Once qualified you could earn between £18,000 and £23,000.

As a senior craftsperson you could earn more than £25,000 a year.

## Related opportunities

- Civil/Construction Engineer/Civil Engineering Technician p69
- Marine Engineer p215
- Merchant Navy Engineering Officer p583

## Further information

**British Marine Federation**  
www.britishmarine.co.uk

**Semta**  
www.semta.org.uk

**The Institute of Marine Engineering, Science and Technology**  
www.imarest.org

## Qualifications and courses

Entry to this career is usually with a degree or a BTEC HNC/HND in a relevant subject such as marine engineering, naval architecture, marine technology or offshore engineering. Entry to a degree course usually requires at least 2 A levels/3 H grades, including Maths, English and a science subject, and 5 GCSEs/National 5s (A\*-C/A-C). Entry requirements for an HND course are usually 1 A level/Higher or a BTEC Level 3 Certificate/Diploma in a relevant subject.

When seeking employment, you may be able to secure a graduate apprenticeship scheme post-university, provided by some companies, where you will receive training on the job. The Royal Navy also accepts applications for engineering officers from candidates in their final year of university. Upon completion of your service, you could then move into the commercial marine engineering industry.

Alternatively, you could enter the industry at a lower level by undertaking an apprenticeship as a marine engineering technician and then later working your way up to marine engineer by undertaking additional training and qualifications on the job.

The Merchant Navy Training Board also offers a number of training and sponsorship schemes for entrants at 3 stages, the GCSE/National 5 and A level/H grade stage, the undergraduate stage and the graduate stage. All entrants should be in good health and will be required to pass a statutory medical exam prior to being employed at sea. You must also seek sponsorship from a shipping company or training provider prior to acceptance. Trainees will spend alternate periods at college and at sea, whilst working towards industry recognised qualifications and professional maritime certificates. Each route provides opportunities for progression through the ranks, eventually reaching chief engineer level.

To update your skills, improve your career prospects and ensure a salary increase, you may wish to work towards securing incorporated (IEng) or chartered engineering (CEng) status.

## What the work involves

Marine engineers design, construct and maintain ships' seafaring equipment, as well as developing and preserving offshore systems.

You could work in a shipbuilding company, on-board ships and submarines, in marine surveying, in an oil company or in the leisure industry.

You will work across a range of engineering disciplines, including electrical, construction and mechanical. You will work closely with naval officers, architects, other professionals and team members.

## Type of person suited to this work

You will need excellent communication skills, both oral and written, in order to manage and lead your team as well as liaise with other professionals and clients.

Excellent maths and IT skills are essential, as is an ability to solve problems under pressure. Prioritising your workload through careful planning and project management is also very important.

You should be good at working within a team, especially as you might have to live and work with colleagues in confined areas when undertaking projects on boats or submarines.

## Working conditions

You could work anywhere from an office to a boatyard, or even on a submarine, and many jobs involve a combination of office-based and on-site work.

If you are working on projects on a ship or offshore installations, living accommodation can be tight and you will probably need to spend time away from home.

The job involves climbing and lifting equipment so you will need to be physically fit.

## Future prospects

Prospects are good for marine engineers. You could work for a variety of companies, from small shipping businesses, to leisure cruise liners, through to joining the Royal Navy.

When you have gained skills and experience, you could go on to specialise in project management or marine research, or even work as a consultant.

There are plenty of opportunities to work abroad.

## Advantages/disadvantages

There are a huge variety of employment options available to you, from conservation projects to defence systems.

You will work in numerous diverse areas, and with many different people, so the work will always be interesting and fresh.

You may be working in cramped, uncomfortable conditions for long periods of time. This includes living and working with colleagues 24 hours a day on certain projects.

## Money guide

As a graduate marine engineer, you could expect to earn around £23,000.

Experienced marine engineers can expect a salary of between £28,000 and £55,000 a year, depending on experience and responsibilities.

## Related opportunities

- Electrical Engineer p203
- Marine Craftsperson p214
- Mechanical Engineer p217

## Further information

**Engineering Council UK**  
[www.engc.org.uk](http://www.engc.org.uk)

**Merchant Navy Training Board**  
[www.mntb.org.uk](http://www.mntb.org.uk)

**The Institute of Marine Engineering, Science and Technology**  
[www.imarest.org](http://www.imarest.org)

## Qualifications and courses

Whilst there are no formal entry qualifications needed to work as a meat processor, some employers value GCSEs/National 5s in English and Maths, particularly when considering candidates for supervisory, inspection or technical levels.

One route of entry into the industry as a meat process worker is via an apprenticeship. The most relevant apprenticeships available include the Improve Proficiency Apprenticeship in Food and Drink (Meat and Poultry Industry Skills) and the Improve Proficiency Apprenticeship in Food and Drink (Food Manufacturing Excellence).

As an apprentice you will typically experience a combination of on-the-job training for professional meat process workers with a series of day or block release instruction at a college or training centre where you will work towards gaining industry-recognised qualifications. The courses that may be available to you include the NVQs/SVQs in Meat and Poultry Processing or Food Manufacturing Excellence (Levels 2–3) and then on to an NVQ/SVQ Level 4 in Meat Processing Management or Food Safety Management. The Meat Training Council (MTC) also offers a number of further education courses, such as the Intermediate Certificate in Meat and Poultry. Your training will cover health and safety procedures, food hygiene and quality assurance. Alternatively, you could opt to complete courses such as these full time at college before seeking employment.

To work at an abattoir or meat processing plant you must be aged 18 or over, and hold a Certificate of Competence in the Protection of Animals at Time of Killing. A driving licence may be required, particularly in operating forklift trucks.

To enhance your contacts and ensure you remain up to date with any industry developments, you may opt to register with the Worshipful Company of Butchers Guild.

## What the work involves

Meat process workers do everything from herding animals, to slaughtering, to cutting up carcasses, to packaging and grading meat and ensuring it is free from contamination and ready to sell to the public. A meat process worker could specialise in either of the following roles.

### Abattoir operative

You will slaughter animals for food.

After the animals have been humanely killed, you will separate the edible meat from the waste.

### Meat manufacturing operative

You will manufacture meat products.

You may also weigh, wrap and label the meat.

## Type of person suited to this work

This can be distressing work, so you should be prepared to cope with blood and mess.

As you will have to do lots of lifting and operating machinery, you will need to be physically fit.

You should have a responsible attitude as you may use dangerous knives and machinery. You also need to be aware of your personal cleanliness as you are part of a food production process.

## Working conditions

Refrigerated areas are cold and all areas need frequent cleaning and so may be wet. You will be expected to wear protective clothing, including footwear and hairnets.

You will normally do a 40-hour week, usually from 7.30am to 3.30pm although shift and part-time work are possible.

## Future prospects

### Abattoir operative

With experience you could apply for senior positions or look to move to related areas such as butchery, retail or food marketing. Other options are jobs in quality control, health and safety consultancy or self-employment.

### Meat manufacturing operative

With experience you could apply for supervisory, quality control and management jobs or move into related areas of work such as retail butchery.

With the right experience, qualifications and training you may be able to progress into work on the meat inspection teams employed by the Meat Hygiene Service (MHS) – part of the Food Standards Agency.

## Advantages/disadvantages

This can be cold, smelly and dirty work. The job can be repetitive and monotonous.

You will be part of a team and often there is a good working atmosphere.

## Money guide

### Abattoir operative

The minimum salary for trained adults is around £12,000 per year (although apprentices may receive less). With experience this can rise to between £15,000 and £22,000 a year.

### Meat manufacturing operative

The starting salary is usually around £12,000 per year. Experienced meat manufacturing operatives can expect a salary of between £14,000 and £20,000.

## Related opportunities

- Butcher p454
- Kitchen Assistant/Supervisor p131
- Meat Hygiene Inspector p462

## Further information

**Department for Environment, Food and Rural Affairs**  
www.defra.gov.uk

**Food Standards Agency**  
www.foodstandards.gov.uk

**Meat Training Council**  
www.meattraining.org.uk

## Qualifications and courses

Most employers require candidates to have completed a degree in a relevant subject such as mechanical, nuclear, aeronautical, civil or computer-aided engineering. For entry on to a degree course you will need at least 2 A levels/3 H grades, including Maths and Physics, and 5 GCSEs/National 5s (A\*-C/A-C). An accredited Foundation degree or BTEC HNC/HND can also provide a path into the industry with further training later. Some employers place as much emphasis on general communication skills and commercial awareness as they do on a candidate's degree class, but if you wish to seek chartered status (CEng) later on in your career, a postgraduate qualification or a Master of Engineering (MEng) is recommended.

Some employers recruit graduates only, therefore you may struggle securing employment as a diplomate. However, diplomates are considered for technician level posts which are entered via an apprenticeship. To apply for an apprenticeship you will need GCSEs/National 5s (A\*-C/A-C) in English, Maths and a science. You will work towards an NVQ in Performing Engineering Operations, Mechanical Manufacturing Engineering or Technical Services (Levels 1-3). In order to progress however you will need to take a top-up course to convert to degree level.

Some companies may offer graduate training schemes for newly qualified engineers. If you aim for incorporated (IEng) or chartered (CEng) status, it is important that your training scheme be accredited by the Institution of Mechanical Engineers (IMechE). A mentor will monitor the early stages of your development while you undertake a structured programme of training. With appropriate experience and the necessary qualifications, you will gain professional status, significantly improving your prospects and salary as a result.

## What the work involves

Mechanical engineers design, develop and maintain the moveable parts of all equipment, ranging from those in small household appliances up to large machinery.

You will probably work on a project from start to finish, so will be involved with all aspects from design and development through to manufacture.

You could work in a number of industries, including manufacturing, sport, medicine or transport.

You will also have to manage budgets, resources and people on each project.

## Type of person suited to this work

You will need an exceptionally high level of scientific knowledge and technical ability in order to design mechanisms and solve practical problems as they occur in the development process.

Good communication skills, both oral and written, are essential for dealing with colleagues, other professionals and clients on a daily basis. You will also be required to produce detailed reports and presentations.

Excellent organisational skills and the ability to work under pressure are a must, as are good IT skills including knowledge of computer-aided design (CAD).

## Working conditions

You will usually be required to work longer hours than those of the average working week, but evening or weekend work is rare.

You will be based mainly in an office although you will also spend a good amount of time on site, whether in a factory, workshop, hospital or other building. Despite this travel, overnight absence from home is uncommon.

You will need to wear a smart suit while in the office, but appropriate safety equipment when on-site.

## Future prospects

Job opportunities for mechanical engineers are found throughout the UK, particularly in cities. There are also excellent opportunities for working abroad.

With experience, you will be able to qualify for chartered engineer (CEng) status. You could become self-employed and undertake freelance work which will give you greater flexibility over your work-life balance. Alternatively, you could go on to increasingly senior engineering posts, or even set up your own consultancy.

Some engineers choose to move into a more business-orientated role within their company such as sales.

## Advantages/disadvantages

It is exciting to be at the forefront of creating new products and finding solutions to mechanical problems across numerous industries. You will be working on a variety of projects and meeting a range of people, so the work is rarely boring.

There are excellent opportunities for career development, including the option of working overseas.

You may have to work long hours to meet project deadlines.

## Money guide

Starting salaries can range from £20,000 to £28,000 and, with experience, could increase to between £35,000 and £50,000.

Engineers with chartered status/10-15 years' experience can earn up to £55,000.

## Related opportunities

- Clinical/Biomedical Engineer p276
- Electrical Engineer p203
- Marine Engineer p215

## Further information

**Engineering Council UK**  
[www.engc.org.uk](http://www.engc.org.uk)

**Institution of Mechanical Engineers**  
[www.imeche.org](http://www.imeche.org)

## Qualifications and courses

Although you do not need any formal qualifications to begin training as a motor vehicle technician, most employers, particularly larger companies, value those candidates with 4 GCSEs/National 5s (A\*-C/A-C) in English, Maths and a science.

There are several ways to enter the industry at a trainee level. A common route is via an Intermediate or Advanced Apprenticeship in Vehicle Maintenance and Repair. This scheme involves learning on the job while gaining qualifications at college.

Another option is to study full time at college for relevant qualifications. Many training centres have links with local employers which could be a route into work experience or employment. City & Guilds provide the NVQ in Automotive Maintenance and Repair, Body and Paint, Vehicle Fitting and Roadside Assistance (Levels 1-3). IMI Awards offer the NVQ Level 2 in Vehicle Maintenance and Repair specialising in either Motorcycle or Auto Electrical and the NVQ Level 3 in Vehicle Fitting Operations. Those who wish to pursue higher qualifications could take the BTEC Level 3 Certificate/Diploma in Vehicle Technology, the BTEC Higher National Certificate/Diploma in Automotive Engineering (Levels 4 and 5) or the City & Guilds Level 4 Certificate in Advanced Automotive Diagnostic Techniques.

To enable career progression, you may later opt to complete a qualification that allows you to specialise in a particular area, such as in MOT testing, air conditioning or LPG conversions.

You are likely to require a driving licence for the type of vehicle you work with. You also need good colour vision.

## What the work involves

Motor vehicle technicians are responsible for the maintenance and repair of all vehicles, including cars, motorbikes, lorries and coaches.

You will need to carry out routine jobs, such as servicing a vehicle, and identify technical problems, advising customers which repairs are necessary and the costs involved.

You will work on a variety of different mechanical and electrical systems and use a range of tools and equipment.

## Type of person suited to this work

You need an excellent technical and mechanical knowledge of most motor vehicles and you will be expected to build on this knowledge throughout your career to ensure that you are familiar with technological changes.

Strong communication skills are required for advising customers and you must be able to work well within a team.

Full colour vision, a good level of fitness and the ability to think quickly and work methodically are all essential. You will also need good IT skills in order to understand and fix the computerised equipment in vehicles.

## Working conditions

You will usually work 40 hours a week, just above the national average. Most of your work will involve regular hours but occasionally, depending on your employer, you may be expected to work shifts, weekends and overtime.

If you specialise in repairing broken-down vehicles, you might have to travel to their location at any time of the day or night.

You will usually work in a garage, which can be noisy, and cold in winter. You will need to wear overalls and use other safety equipment to protect you while you work.

## Future prospects

Being a motor vehicle technician provides good career opportunities as there is currently a shortage of skilled technicians across the UK. The variety of work available is good with opportunities possible in garages, freight transport, construction, vehicle hire or breakdown companies, car dealerships as well as in local authorities.

Within a larger organisation, you could progress to a senior or supervisory level as a technician, or alternatively move into a management or training role. You could also specialise in a specific type or make of vehicle.

There is also the option of setting up your own repair business, although the initial costs of hiring and equipping premises can be high.

## Advantages/disadvantages

There is demand for technicians throughout the UK so you should be able to find a job in the location of your choice.

The hours are fairly regular and it is unlikely that your work will involve absences from home.

You may have to work in cold or cramped conditions which can be unpleasant.

## Money guide

Trainee motor vehicle technicians may have a starting salary of £10,500-£11,000.

Once qualified, you could expect £15,000-£20,000.

Those with extensive experience in the industry can achieve in excess of £25,000.

Garage owners and self-employed technicians can earn considerably more.

## Related opportunities

- Electrician p78
- Highways Maintenance/Road Worker p89
- Sheet Metal Worker p226

## Further information

### GoSkills

[www.goskills.org](http://www.goskills.org)

### The Institute of the Motor Industry

[www.theimi.org.uk](http://www.theimi.org.uk)



## Qualifications and courses

Candidates seeking to become a nuclear engineer require a degree in mechanical, electrical or chemical engineering but you could still enter with a related degree subject such as maths, physics or science. Some universities offer specialist degrees in nuclear engineering and the Nuclear Industry Association (NIA) provides further information on these courses. For degree entry you will need at least 2 A levels/3 H grades, including Maths and a science subject, and 5 GCSEs/National 5s (A\*-C/A-C). A postgraduate qualification, although not a requirement, may give you an advantage when looking for work and will make the process of seeking chartered engineer (CEng) status easier.

You can also enter the industry with an HND in a relevant subject such as General Engineering, Civil Engineering, Maths or Physics. Entry requirements are usually 1 A level/2 H grades or a BTEC National Certificate in a relevant subject.

When you are seeking employment, some companies offer opportunities for apprenticeships or training schemes which combine study at degree or postgraduate level with work-based learning. The Nuclear Technology Education Consortium (NTEC) offers professional development courses which your employer may encourage you to undertake. Entry requirements are usually a minimum of a 2.2 degree in a relevant subject.

Once experience has been gained, nuclear engineers with a Master of Engineering (MEng) can apply for chartered engineer (CEng) status with the Engineering Council and those with a bachelor's degree are eligible for incorporated engineer (IEng) status. Professional membership with the institutional body relevant to your role will significantly improve your career prospects and earnings.

## What the work involves

Nuclear engineers work mainly in the large-scale production of nuclear energy, although they can be involved in smaller industrial or medical projects.

Alternatively, you could work in developing effective nuclear waste management systems.

You might lecture and train other people on the subject of nuclear power.

## Type of person suited to this work

You will need excellent communication skills, both oral and written, in order to manage and lead your team, and liaise with other professionals and clients. The ability to work effectively as part of a team is also important.

You should possess an analytical mind and a logical approach to problem solving. Excellent maths and IT skills are also essential.

As you will be working with nuclear hazards, you must be able to take responsibility for your own safety and that of your colleagues.

## Working conditions

You will usually work a normal 37-hour week, although you may be required to work additional hours as project deadlines approach. If you work in a nuclear power station, your hours will usually adhere to a 7-day shift system.

The majority of the work will be indoors in a power plant, laboratory, office or factory.

You may have to work in hot, cramped conditions and you will have to wear protective clothing in certain situations. As you will be working with radioactive substances, you will also need regular medical check-ups.

## Future prospects

Prospects are good for nuclear engineers. In 2013, the government outlined an initiative to develop the UK's nuclear energy programme. It is thought this could generate up to 40,000 new jobs for workers. The strategy has proposed to make the UK the leading civil nuclear energy nation.

With continued study and increased experience, you can move into more senior positions within any company or discipline.

## Advantages/disadvantages

Nuclear power is a growing industry so employment opportunities will increase accordingly.

You have the opportunity to work freelance after building significant experience so you can achieve a suitable work-life balance.

You will be working in an environmentally controversial industry which could potentially upset your friends and family.

## Money guide

Graduate nuclear engineers typically have a starting salary of £20,000-£25,000.

With increased experience, earnings rise to between £30,000 and £50,000.

Senior engineers with chartered status could achieve £55,000-£65,000.

Some companies offer excellent benefit packages and bonus schemes.

## Related opportunities

- Aerospace Engineer p196
- Chemical Engineer p201
- Mechanical Engineer p217

## Further information

### Nuclear Industry Association

[www.niauk.org](http://www.niauk.org)

### Semta

[www.semta.org.uk](http://www.semta.org.uk)

### Qualifications and courses

There are no formal entry requirements in order to become a paper manufacturer, but having some GCSEs/ National 5s (A\*-E/A-E) in English, Maths and a science will be useful.

You can usually enter the field straight from school, working your way up whilst training on the job as an apprentice. Apprenticeships typically involve a combination of on-the-job training and formal instruction at a college or training centre where you will work towards industry-recognised qualifications.

Courses that may be available include an NVQ in Combined Working Practices (Levels 2-3), Performing Manufacturing Operations (Levels 1-2), Fibreboard Operations (Levels 2-3) or a Certificate in Paper Technology (Levels 2-3). There are also short courses and workshops in paper technology offered by the Confederation of Paper Industries (CPI). Your employer will also offer you additional training in health and safety, the operation of machinery and possibly, in forklift truck driving.

To become a technologist, you will need a BTEC HNC/ HND in Applied Science (Chemistry) or a relevant degree in a science or engineering discipline. You will gain experience and training within different departments once employed and you may be offered the opportunity to study at postgraduate level, for example in paper science or packaging technology.

To improve your prospects, membership with the Paper Industry Technical Association (PITA) is advised.

### What the work involves

Paper manufacturers/technologists work with the equipment and systems that turn wood pulp and other materials into many different kinds of paper.

As a manufacturer, you might be operating the machine that breaks down the raw materials, managing what is going on inside, checking consistency, adjusting the controls or managing the steam system that dries the paper, or overseeing the packaging process.

As a technologist, you would design and test the equipment used in the manufacturing process. You may trial new products, ensure the quality and safety of materials, write technical reports or supervise the work of manufacturers.

### Type of person suited to this work

You need to be good with your hands, and good at team-working and communication with others.

Being able to act on your own initiative is important, and you should have an accurate and methodical mindset.

Following plans and diagrams is a big part of the job, so you should be confident in this, and the ability to work with chemicals is also important.

A lot of the work will involve using computerised machinery. You must be capable of adapting to new equipment and learning to use it safely and accurately.

### Working conditions

This kind of work usually takes place in shifts. You could be working daytimes, evenings, nights or weekends depending on your company, and it may well be a combination of them all.

It is normal for you to work 38 to 40 hours a week. Overtime is usually available and often encouraged.

You will be working on the factory floor most of the time or in the control room. This is so that you can monitor the processes being carried out by the machines you are looking after.

It will sometimes be necessary to work outdoors in order to load and unload delivery wagons.

### Future prospects

As a manufacturer or technologist, you could find work within the paper mills and paper recovery plants based in Scotland and the north-west, south-west and south-east and Yorkshire areas of England.

With experience you can apply for positions at technician and supervisor level, which can turn into engineering roles. As a technologist, it may be possible to move into research posts in universities or with companies overseas.

You could also move around in the industry, changing to a career such as management or sales.

### Advantages/disadvantages

Opportunities to progress are good in this job, and even if you come straight from school and work on the factory floor, you could move up to sales or management relatively quickly.

The work may be a little mundane to start with.

Conditions inside the factory can be noisy, hot and humid.

### Money guide

A trainee manufacturer can earn around £12,000 and with experience, this can increase to between £14,000 and £21,000.

Starting salaries for paper technologists are between £17,000 and £20,000, with £25,000 being possible after experience.

### Related opportunities

- Chemical Engineer p201
- Manufacturing/Production Engineer p213
- Textile Operative p229

### Further information

**Confederation of Paper Industries**  
[www.paper.org.uk](http://www.paper.org.uk)

**Paper Industry Technical Association**  
[www.pita.co.uk](http://www.pita.co.uk)

**Proskills UK**  
[www.proskills.co.uk](http://www.proskills.co.uk)

## Qualifications and courses

Most entrants to this profession have a degree in a related subject such as polymer science, materials engineering, materials technology or materials science. For entry onto a degree course you will need at least 2 A levels/3 H grades in subjects including chemistry, maths or physics and 5 GCSEs/National 5s (A\*-C/A-C). A 1-year Foundation degree may be available for those who wish to take a relevant degree but do not have the required scientific subjects. Several universities provide their students with first-hand experience of polymer processing equipment and small-scale production.

A postgraduate qualification, in materials engineering or polymer technology for instance, is recommended to those candidates whose first degree was in a broad engineering or science subject.

It may be possible to gain entry into this profession with an HNC/HND in polymer technology or manufacturing engineering. Given the variety of skills required of a polymer technologist, entrants with relevant experience are welcomed.

Some companies offer training programmes in engineering that combine study at degree or diploma level with structured work-based learning. Entrants are paid in terms of how much time is spent in the workplace and this could offer an effective way of securing employment once qualified.

The British Plastics Federation (BPF) provides professional development for those within the industry, offering both short courses and the master's level Materials for Industry (Mfi) programme.

## What the work involves

Polymer technologists use polymer materials, such as plastics, rubber, adhesives, resins and fibres, to manufacture products. You will utilise these materials to make a wide range of products including toys, casings for mobile phones, medical devices, tyres, wetsuits and hoses.

You might also use composite polymer materials when manufacturing car bodies or aircraft wings instead of traditional materials such as metal.

You will be responsible for developing the moulds used to form materials during manufacture. This is a job that requires specialist skills as a minor flaw could ruin an entire batch of products.

## Type of person suited to this work

You should have a strong interest in materials science, chemicals, engineering and design technology. A good understanding of manufacturing processes and construction methods is also important.

Familiarity with computer-aided design and developed IT skills would be beneficial.

Analytical and numeracy skills are required for analysing projects or problems that arise.

You must be able to communicate effectively with people as you will be working within, and possibly leading, a team.

You should be able to take initiative, use your creativity and find a solution when you are confronted with a problem.

## Working conditions

You will work between 35 and 40 hours per week, Monday to Friday. It may be necessary for you to work additional hours to meet deadlines. Overtime and weekends will increase your pay accordingly.

Your time may be divided between the office, the laboratory and the factory. As you will be required to travel, it would be useful to have a driving licence.

You will be expected to wear protective clothing in some of your working environments.

## Future prospects

Polymer science is a growing industry with a shortage of qualified staff. As new uses are found for plastic, rubber and composite materials, the industry will continue to develop. There are many opportunities for promotion within the field.

You could work for a variety of companies including manufacturers of medical equipment, toy companies and aerospace engineering firms. Smaller businesses tend to specialise in the manufacturing of electrical switches and light fittings, whilst the larger companies produce goods such as food packaging and fragile components.

Alternatively, you could choose to specialise in a specific area such as vehicle manufacturing, aviation or medical equipment.

## Advantages/disadvantages

You may have the opportunity to travel locally and abroad as part of your work.

The factory or laboratory conditions that you work in may sometimes be noisy and messy.

## Money guide

Starting salaries are around £14,000–£18,000.

With experience, you can expect to earn £20,000–£25,000.

Those at senior level or who work as a specialist technologist can achieve £35,000 or more.

## Related opportunities

- Aerospace Engineer p196
- Chemical Engineer p201
- Manufacturing/Production Engineer p213
- Materials Scientist p502

## Further information

**British Plastics Federation**  
www.bpf.co.uk

**Institute of Materials, Minerals and Mining**  
www.iom3.org

## Qualifications and courses

Most entrants have prior experience in a relevant industry. For example, you might have started your career in a production role and then progressed to the level of quality control inspector. Employers usually seek applicants with 4 GCSEs/National 5s (A\*-C/A-C) including Maths, English and a science subject or equivalent vocational qualifications in engineering or food science.

As a quality control inspector you could specialise in a particular sector such as aerospace or pharmaceuticals. For this you may require A levels/H grades, a BTEC/SQA National qualification, an HNC/HND or a degree in science, technology or quality management.

Engineering apprenticeships may offer an alternative route of entry for a career as a quality control inspector. Intermediate Apprenticeships in Improving Operational Performance or the Intermediate and Advanced Apprenticeships in Food and Drink are available. You will experience a combination of on-the-job training from professionals and formal instruction at a college or training centre where you will work towards industry-recognised qualifications in quality control or management. Awards available include an NVQ in Food Manufacture (Levels 1-3), a Diploma in Engineering Inspection and Quality Control, and a Chartered Quality Institute (CQI) Certificate/Diploma in Quality or Quality Management (Levels 3-5).

To enhance your career prospects, it is recommended that inspectors gain membership with the CQI. By doing so, you can apply for Chartered Quality Professional (CQP) status and significantly increase your earning potential.

## What the work involves

Quality control inspectors work in a variety of industries such as engineering, food, pharmaceuticals and clothing, where manufacturing procedures must be monitored to ensure that products meet specified standards.

You will test products as they go through each stage of production by observing, measuring and weighing samples, and comparing results with specified requirements. You will also work to ensure that quality and safety standards are maintained by checking and testing materials sourced from external suppliers.

You will write reports on the tests that you carry out and help to come up with solutions to any problems or inconsistencies that arise.

## Type of person suited to this work

As you will be regularly inspecting products and manufacturing processes, you must be highly organised and methodical with a keen eye for detail.

You should be responsible, thorough and able to solve problems efficiently.

You will have an aptitude for communicating with others and for advising and persuading people to improve standards.

Good written communication skills are required for writing up reports on testing methods and results.

You should have an interest in the science and technology of the industry that you are monitoring.

You also need a keen awareness of health and safety procedures.

## Working conditions

You will work 35-40 hours a week and this will often include shift work, weekends and nights.

You could be based in a laboratory or an office. You will also frequently visit factories or warehouses to monitor production processes or meet with staff. These locations may be clean and bright or noisy and dirty. Protective clothing is often required.

## Future prospects

Though quality control is an important part of company competitiveness, sophisticated equipment that can identify faults in products means that there are usually fewer jobs available. With greater emphasis on workers taking responsibility for the quality of their output, inspection activities, generally, are less in demand.

However, there are opportunities to work in many different sectors such as cosmetics, textiles and electrical goods.

When you have some experience you may progress to become a team leader, supervisor or quality manager. You could also move into technical sales or production management.

## Advantages/disadvantages

There may be opportunities to travel and work abroad as a quality control inspector.

You could become self-employed.

Due to developments in technology, companies are increasingly using advanced equipment to monitor quality standards.

## Money guide

Starting salaries are £15,000-£20,000.

Those with experience can expect to earn around £24,000 a year.

With responsibility, you can earn £30,000 to £35,000.

£40,000-£60,000 is possible for freelance inspectors who specialise in high-technology disciplines.

## Related opportunities

- Laboratory Technician p500
- Quality Manager p44
- Trading Standards Officer p472

## Further information

### Chartered Quality Institute

[www.thecqi.org](http://www.thecqi.org)

### Semta

[www.semta.org.uk](http://www.semta.org.uk)

### Qualifications and courses

You will need a degree or HND in a relevant subject such as minerals engineering, environmental sciences, geology or mining engineering, although candidates with degrees unrelated to engineering or mining are sometimes considered. You will typically need at least 2 A levels/3 H grades in sciences and 5 GCSEs/National 5s (A\*-C/A-C) in order to gain entry onto a degree course. Postgraduate qualifications, although not essential, are available in quarry management and may enhance your career prospects. You could also take a year-long industrial placement with a large organisation as part of your degree which will support you post-university, in your search for employment.

Graduate management schemes with large organisations are available and employers often seek candidates with a degree in quarry engineering, IT or business. Trainees gain experience within a variety of company departments before deciding on which function to work in permanently. You may be offered support when studying for further management qualifications. Work experience on a quarry site would be very useful as employers often seek candidates who can show evidence of an ability to communicate effectively, have knowledge of health and safety and a strong level of technical understanding.

The Mineral Products Qualifications Council (MPQC) offers many useful qualifications in risk assessment, supervising safety in quarries, quarry safety inspections and understanding quarries regulations. Entrants will typically acquire professional accreditation with the Institute of Quarrying or the Institute of Materials, Minerals and Mining.

### What the work involves

Quarrying involves opencast mining to extract minerals and other materials to manufacture goods such as chemicals. Your job will involve managing staff in the office and quarries.

On-site you will inspect the quality of the minerals and other products mined as well as ensuring production is on schedule and checking equipment.

In the office you will manage the sales department, look after the budget, produce performance reports and plan changes to the production system when different materials are needed.

### Type of person suited to this work

You will need to have good communication skills as you will be liaising with a wide range of people. You must also have a good technical knowledge of the production system in quarries. You should be business minded with excellent management skills.

You will need to be aware of health and safety legislation as well as government regulations and ensure that these are followed on-site. It is important to have a good understanding of technical drawings and plans.

### Working conditions

You will be on-call in case of emergency. You will typically spend 2 days on-site and 3 days based in an office.

You must wear protective clothing such as helmets and ear protectors when on-site and be prepared to work in all weathers.

### Future prospects

The variety of different areas within the quarrying sector means that there is a great deal of work available to quarry managers within a strong industry that offers workers a well-established career route and a comparatively low level of job competition.

After gaining experience, it might be possible to progress into a managerial role in area operations but you may have to relocate in order to increase your level of responsibility. The type of quarry you specialise in, eg hard rock quarrying or sand and gravel, will impact your career progression and the skills which you will need to develop.

It would be helpful to become a member of the Institute of Quarrying. It has a professional development system which ranges from student to fellowship levels. Career prospects can be improved by further qualifications in management and quarry legislation. It will be necessary to take jobs at different quarries to improve career progression, unless you work for a big company. However, personal development generally remains in the hands of the individual.

### Advantages/disadvantages

You will have a high level of responsibility.

You will spend time working outdoors. Long hours, including work at weekends, are common in this industry.

Working conditions on sites are dirty, dangerous and noisy, with sites often based in rural areas.

### Money guide

A new assistant quarry manager can earn £23,000 or more.

£35,000 is a typical starting salary for a quarry manager.

A unit manager who is in charge of a number of quarries or a big quarry can earn in excess of £50,000.

Salaries will depend upon the location of the site and the employer. Benefits such as private healthcare and bonuses may be offered.

### Related opportunities

- Construction Operative p72
- Demolition Operative p76
- Quarry Worker p224

### Further information

**Institute of Materials, Minerals and Mining**  
[www.iom3.org](http://www.iom3.org)

**Institute of Quarrying**  
[www.quarrying.org](http://www.quarrying.org)

**Proskills UK**  
[www.proskills.co.uk](http://www.proskills.co.uk)

### Qualifications and courses

This job does not have any formal educational requirements. Some employers do, however, generally seek candidates who hold at least 5 GCSEs/National 5s (A\*-C/A-C) in relevant subjects such as English, maths, a science and technology. The Diploma in Engineering or Construction and the Built Environment could be useful when seeking employment, as is any experience of construction, mining or mobile plant machinery operation.

Apprenticeships in Extractive and Mineral Processing Operations may offer a route of entry into the industry. Construction companies and quarrying firms offer school-leavers both on-the-job training and the opportunity to study for work-based qualifications accredited by the Mineral Products Qualifications Council (MPQC). Courses you may work towards include a Level 3 Certificate/Diploma in the Extractive and Minerals Processing Industries, an NVQ Certificate in Processing Operations for the Extractive and Minerals Processing Industries or an NVQ Diploma in Complex Processing Operations for the Extractive and Minerals Processing Industries. Short courses in risk assessment and hazards, safety passports, quarry regulations and competency schemes are also available.

Once on the job, you could also work towards an NVQ in either Specialised Plant and Machinery Operations (Levels 1-2) or Level 2 in Drilling Operations. An NVQ Level 3 in Blasting Operations or equivalent is needed to work with explosives. If you wish to progress into managerial jobs, a bachelor's degree will normally be required.

A LGV licence would be helpful, but some vehicles can be driven on a full category B driving licence.

### What the work involves

There are many types of quarry worker. A machine operator controls heavy equipment whilst a plant and process operator is focused on the screening plant.

Shotfirers are responsible for explosives and drillers are responsible for creating holes for explosives and investigation.

Truck drivers, maintenance workers and laboratory technicians are also needed to undertake quality control and investigate samples from the site.

### Type of person suited to this work

You need to be strong, fit and active to do this job.

You must also follow safety regulations at all times owing to the dangers that could arise when using heavy machinery.

You need to be able to work well with others as teamwork is a big part of this job.

An interest in mechanical work is also crucial. Quarry workers should enjoy working outdoors and be prepared to do so in all weathers.

### Working conditions

You will often work in shifts, which will include early mornings and late nights. Floodlights will be switched on during these periods.

You should be prepared to travel for long periods of time to reach sites, as they are predominantly located in rural areas.

Working conditions are often dirty, noisy, muddy and dangerous. Protective clothing such as helmets and ear protectors must be worn at all times. Work will often include a lot of carrying and climbing.

### Future prospects

Roughly 1,000 quarries exist in the UK. Although each local authority will have a quarry, the majority of them are located in the East Midlands and south-west of England.

After gaining experience and the necessary further qualifications, you may be able to progress into a role as a supervisor, manager, laboratory or quality control technician or health and safety inspector.

Drivers, mechanics and fitters can undergo training to become drillers or shotfirers.

### Advantages/disadvantages

You could use powerful machines such as drills and excavators or explosives.

You will work outdoors. Working conditions are muddy, noisy and dangerous.

Travel times to work can be fairly long as sites are often located in remote, rural areas.

### Money guide

Salaries will depend upon the location of the site and the employer. They can also be boosted by extra payments from overtime, bonuses and shift work.

The starting salary for an operator is about £12,000.

After gaining experience and training this could rise to between £17,000 and £23,000.

If you are a specialist with significant experience, or progress to a role as a manager, you could earn up to £40,000 a year.

### Related opportunities

- Construction Operative p72
- Demolition Operative p76
- Quarry Manager p223

### Further information

**Institute of Materials, Minerals and Mining**  
[www.iom3.org](http://www.iom3.org)

**Institute of Quarrying**  
[www.quarrying.org](http://www.quarrying.org)

**Proskills UK**  
[www.proskills.co.uk](http://www.proskills.co.uk)

## Qualifications and courses

The typical entry route into this profession is through an apprenticeship scheme or a training scheme with one of the major rail engineering firms, such as Network Rail. The Advanced Apprenticeship in Rail Traction and Rolling Stock Engineering is available. Entry requirements are usually 3–5 GCSEs/National 5s (A\*–C/A–C) including English, Maths, a science and technology. It would be very beneficial if you have experience working as a mechanical fitter, electrician or craftsman in another industry.

The selection process for employment involves a medical exam that aims to test candidates' physical fitness, eyesight and hearing. An aptitude test may also be set in order to assess your existing skills and knowledge.

As an apprentice, you will first be trained in basic engineering craft skills before experiencing a combination of on-the-job practice alongside professional fitters and technicians and a series of day or block release instruction at a college or training centre where you will work towards gaining industry recognised qualifications. Relevant qualifications include the NVQ Level 2 in Rail Transport Operations and the NVQ in Railway Engineering (Traction and Rolling Stock) (Levels 2 and 3). These awards cover areas such as safe working, maintaining equipment, testing systems and preventative maintenance.

An ability to drive and access to personal transport is often required, as is a track safety card. Your employer will put you through a Personal Track Safety (PTS) course in order to gain one of these.

## What the work involves

A mechanical fitter will maintain and service the traction and rolling stock, plant, machinery and passenger coaches.

You could also repair station equipment such as customer lifts and hoisting equipment.

An electrical fitter will work alongside mechanical fitters and other engineers, specialising in the electrical side of the maintenance and servicing work on the traction and rolling stock, plant machinery and passenger coaches.

A multi-skilled fitter will possess the skills held by both mechanical and electrical specialists so they will be able to work in all aspects of railway maintenance.

## Type of person suited to this work

You should enjoy working with your hands, diagnosing faults and working out solutions. You will be comfortable using different hand tools and equipment and enjoy working in a team alongside other fitters.

Physical fitness is important as you will be on your feet, working at your bench or directly within the various railway stock.

You should be happy to follow verbal and written instructions, be able to read and understand technical drawings and diagrams and have a responsible attitude to health and safety.

## Working conditions

Much of your work will take place within heated workshops or depots. Sometimes you will have to visit jobs which are outdoors, for example near railway sidings or within a station. On these occasions it might be cold and dark.

As many of the work places are in remote areas, it is often essential to have your own transport.

You will have to wear protective clothing and be prepared to work in cramped places, engaging in lots of bending and lifting.

You will have a 37-hour working week with shifts that cover early, late, evening and weekend hours. You might also need to be on-call for emergencies that occur outside your working hours.

## Future prospects

The rail industry is one of the largest industries in the passenger transport sector and is continuing to expand, therefore the demand for new recruits is increasing.

Well-developed promotional and in-service training programmes exist which help fitters to progress to supervisor, technician, team leader and management levels.

Many specialist maintenance companies carry out work for operating companies and engineering companies, making new traction units and carriages.

## Advantages/disadvantages

Owing to the range of jobs within the railway industry, it is possible to move sideways into other related job areas.

Working on the railway tracks is hazardous so you must be aware of health and safety procedures.

## Money guide

Trainees will usually earn £12,000–£15,000 per year.

Those with experience and relevant qualifications can achieve a salary ranging from £18,000 up to £30,000.

Further benefits include increased pay for working overtime and free or discounted rail travel.

## Related opportunities

- Mechanical Engineer p217
- Rail Signalling Technician p588
- Rail Track Maintenance Operative p589

## Further information

### Engineering Council UK

[www.engc.org.uk](http://www.engc.org.uk)

### GoSkills

[www.goskills.org](http://www.goskills.org)

### Network Rail

[www.networkrail.co.uk](http://www.networkrail.co.uk)

## Qualifications and courses

Entry into a career as a sheet metal worker is usually via a training scheme. The Apprenticeship in Engineering Manufacture (Craft and Technician) is available at Advanced Level. To qualify for an apprenticeship, you will need to have at least 5 GCSEs/National 5s (A\*-E/A-E) in subjects including maths, English and a science. Vocational awards in engineering drawing, metalwork or other practical subjects may also be considered by employers.

The Engineering Construction Industry Training Board (ECITB) offers a fast-track Advanced Apprenticeship under the National Apprenticeship Scheme for Engineering Construction (NASEC). This scheme takes approximately 3 years to complete, with up to a year of college-based learning, followed by practical work on-site and study for professional qualifications. Relevant courses for sheet metal workers include an NVQ in Fabrication and Welding Engineering (Levels 2 and 3) and the BTEC Level 3 National in Manufacturing Engineering. The Welding Institute (TWI) also offers qualifications for those who wish to specialise in welding techniques.

You will be required to hold a Client Contractor National Safety Group (CCNSG) Safety Passport in order to work on-site.

## What the work involves

Sheet metal workers produce parts for a number of important items ranging from vehicles and aeroplanes, through to electrical equipment and common domestic appliances.

You will be using complex engineering drawings as a guide for marking out and cutting each piece.

You will also be operating a variety of machines including hand-powered tools, cutting and pressing devices and computer numerically controlled (CNC) devices.

## Type of person suited to this work

You should have good communication skills and be able to build strong relationships with colleagues as you will be working within a team.

Good numerical skills and the ability to interpret complicated technical drawings are essential for making accurate calculations and creating precise parts. You should also have good IT and technical skills as computer-operated machinery is increasingly being used in this role.

You need a fairly high level of fitness as you will be expected to lift large items and operate heavy machinery. Good eyesight and excellent practical skills are also required in order to use tools and equipment safely.

## Working conditions

You will usually work a 37–39 hour week but shift work and overtime is common. If you are producing bespoke items for a customer to a tight deadline, you may be required to work overnight on occasion.

Work is usually undertaken in a factory or workshop. You will spend the majority of your time at a bench so you will be bending over for most of the day. The work also involves lifting and spending hours on your feet.

You will be required to wear appropriate safety clothing at all times.

## Future prospects

Prospects are good for sheet metal workers.

Once your initial training is completed, you could work towards qualifying as an engineering technician.

Alternatively, you could become a supervisor/manager of an engineering workshop which would increase your responsibility and salary.

Owing to demand, opportunities are available on small and large projects both in the UK and overseas.

## Advantages/disadvantages

You will work with a variety of materials and tools, enabling you to build specialist understanding and knowledge quickly.

With overtime, it is likely that you will work considerably longer than the average working week.

## Money guide

Starting salaries for trainees within this sector are usually £14,000–£17,000.

With experience, you can expect to earn between £17,000 and £23,000.

Workers with supervisory responsibilities or those who are highly skilled in using computer-controlled equipment can achieve in excess of £25,000.

Shift allowances and overtime can increase earnings.

## Related opportunities

- Assembler p197
- Blacksmith p198
- Welder p232

## Further information

**Engineering Construction Industry Training Board**

[www.ecitb.org.uk](http://www.ecitb.org.uk)

**Semta**

[www.semta.org.uk](http://www.semta.org.uk)



## Qualifications and courses

If you wish to become a tailor or dressmaker, you can seek employment or a trainee scheme as a school leaver. A history of work experience is not required as you will be provided with on-the-job training from more experienced colleagues or a master tailor, however a demonstrable aptitude for design, sewing and art is usually highly valued by employers. GCSEs/National 5s (A\*-C/A-C) in English, Maths, Textiles or Art will also be valuable in securing entry-level employment.

To increase your employability, you may opt to gain some of the skills required in the industry by completing a course such as the City & Guilds Award/Certificate/Diploma in Creative Techniques in Fashion (Levels 1-3), the ABC Awards in Fashion and Textiles, the BTEC Certificate/Diploma in Art and Design (Levels 2-3) and the BTEC Higher National in Fashion and Textiles (Levels 4-5). These courses are available on a full or part-time basis or via distance learning.

If you are specifically looking to train as a prestigious Savile Row tailor, you could join the Bespoke Tailoring Apprenticeship programme run by Newham College in partnership with Savile Row Bespoke. This scheme teaches all the skills and knowledge you need to become a top tailor, including pattern cutting, garment construction and sewing by both machine and hand. The intensive programme could lead to an NVQ Level 3 in Bespoke Cutting and Tailoring. The number of opportunities is limited so competition for places is very strong.

Once you are qualified, you could continue developing your skills by working towards higher level qualifications such as an HNC, Foundation degree or degree in fashion or textile design. These qualifications would allow you to move into other sectors of the industry. Alternatively, it may be useful to complete an ABC Level 4 Diploma in Business for Creative Practitioners if you aim to become self-employed.

## What the work involves

Tailors and dressmakers design and make made-to-measure, bespoke items of clothing. They may also be called upon to alter, repair or duplicate certain existing pieces.

Tailors usually make structured items such as suits, jackets and coats. Dressmakers can make a range of clothing, from day dresses and casual trousers to ball gowns and wedding dresses.

You will be working with numerous materials including silk, linen, cotton and polyester and you will also use equipment such as sewing machines, scissors, tape-measures and pins.

## Type of person suited to this work

Since you will be dealing with a range of people, including clients and suppliers, you will need to have excellent interpersonal and verbal communication skills.

Understanding how different cuts, styles and colours flatter various shapes and figures is important for customer satisfaction, as is maintaining a smart/fashionable appearance.

You must be creative and innovative to produce fashion designs.

## Working conditions

You can expect to work 37-40 hours a week. Weekend work is common as that is when most of your clients will be available for meetings and fittings. You could be situated in a workshop, small factory or work from home if you are self-employed.

A reasonable level of physical fitness and flexibility is required, as you will be bending and kneeling when measuring customers and fitting clothes. You may also need to lift and carry heavy rolls of fabric.

A lot of the work is very detailed so you will need a high level of accuracy and good eyesight.

## Future prospects

You could work for a small or large company and create high fashion or more classic pieces. You can also opt to be self-employed.

In larger companies, you may be promoted to a supervisory position and there may also be the opportunity to diversify into pattern cutting or design.

There are opportunities to travel and work overseas, especially if you are involved in fashion and haute couture tailoring or dressmaking.

## Advantages/disadvantages

You will be undertaking very creative work with lots of scope to use your talent and imagination on a daily basis.

Fashion is a fast-paced, interesting and potentially lucrative industry to be working in.

Making clothes requires many hours of concentration and patience.

## Money guide

The average starting salary for both tailors and dressmakers ranges from £11,500 to £13,500.

With experience, your salary could rise to £14,000-£20,000.

Senior tailors or dressmakers, especially those located on Savile Row or who work in high fashion, could earn up to £50,000.

Self-employed tailors establish their own rates based upon their experience and reputation.

## Related opportunities

- Costume Designer p156
- Fashion Designer/Milliner p157
- Textile Operative p229

## Further information

### ABC Awards

[www.abcawards.co.uk](http://www.abcawards.co.uk)

### Newham College of Further Education

[www.newham.ac.uk](http://www.newham.ac.uk)

## Qualifications and courses

Most employers require an accredited degree in a relevant subject such as telecommunications, electronic engineering, computer science, information technology, physics or maths. You will need at least 2 A levels/3 H grades, including Maths and a science, and 5 GCSEs/ National 5s (A\*-C/A-C) to be accepted onto a degree course.

It is possible to enter this sector with an HND in a relevant engineering subject but you will only be able to work at technician level. You could complete a 'top-up' course to convert it into a degree or you may be able to supplement your on-the-job experience with further qualifications at degree level.

Many employers also look for candidates who have a postgraduate qualification such as a Master of Science (MSc). Those with master's level qualifications and extensive industry experience are eligible to apply for chartered engineer (CEng) status through the Institution of Engineering and Technology (IET) which could improve long-term career prospects. Alternatively, you could gain incorporated engineer (IEng) status with a bachelor's degree.

A doctorate could help you to enter the industry at a more senior level or specialise in a particular area.

Post-university, you could seek an IET-accredited graduate training scheme offered by some companies, although competition is fierce and many employers value candidates with evidence of a technical ability, a good understanding of networks, teamwork skills, an ability to adapt and a commercial awareness. Gaining relevant work experience is a useful way to develop these skills and build contacts within the industry.

## What the work involves

Telecommunications engineers are responsible for designing, testing and overseeing the installation of all telecommunications equipment and facilities.

You could work across a variety of engineering fields, including electronics and construction, providing technical guidance and offering solutions to other professionals and clients.

You will be responsible for the management of telecommunications projects which includes planning budgets, recruiting a team and implementing on-site safety. You will also produce written reports and verbal presentations in order to keep both your team and your clients up to date on how each project is progressing.

## Type of person suited to this work

Good communication skills are essential for managing and briefing your team, as well as negotiating with clients and explaining complex technical information to them in a clear and simple manner.

You should have an analytical mind and be excellent at problem solving. The ability to work efficiently under pressure and organise your workload effectively is also essential.

## Working conditions

You will usually work a normal week of about 37 hours, Monday to Friday. Occasionally additional hours may be required, particularly as you progress to more senior positions.

Your working hours may be fairly flexible and you will not always be office based as the industry is seeking to promote working from home and part-time opportunities.

You will sometimes work on-site, checking and overseeing the installation of telecommunications equipment. In these instances, you may find yourself working outdoors or in cramped conditions. You will usually be required to wear appropriate safety equipment as well.

## Future prospects

As the telecommunications industry is continually expanding, particularly due to customer demand for wireless services, job prospects for engineers in this sector are good.

Working in this fast-paced industry will require you to undertake further training throughout your career in order to stay up to date with new products, techniques and developments. Pursuing incorporated (IEng) or chartered (CEng) engineering status will significantly improve your prospects and earnings.

As you gain experience, you could move into senior or management positions. Alternatively, you could become a specialist in a particular sector, start your own company or move into training or consultancy.

## Advantages/disadvantages

Hours are generally regular and there are increasing opportunities to work from home or undertake part-time hours.

In such a rapidly changing industry, you will be learning continually throughout your career.

You will have to spend time on-site which may involve working in cold, muddy conditions, at heights, or in cramped and uncomfortable surroundings.

## Money guide

Starting salaries are typically £22,000-£27,000.

Once qualified, you could earn £35,000-£45,000.

At senior level and with chartered status, you could earn in excess of £60,000.

## Related opportunities

- Civil/Construction Engineer/Civil Engineering Technician p69
- Electrical Engineer p203
- Electrician p78

## Further information

**Institution of Engineering and Technology**

[www.theiet.org](http://www.theiet.org)

## Qualifications and courses

There are no specific entry requirements as training usually takes place once employed under the supervision and mentoring of experienced professionals. The best way to get a position would be to apply directly to textile manufacturers.

Employers may, however, value candidates who have trained in some of the skills required in the role. Courses that may improve your employability include a GCSE/National 5 in Art and Design (including a textiles module), Edexcel BTEC Introductory Certificate/Diploma in Art, Design and Media, and Edexcel BTEC Level 1 Certificate in Art and Design. The Textile Centre of Excellence also offers a Technical Certificate in Textiles that provides a flexible, distance learning programme.

Alternatively, apprenticeships with textile manufacturers may also be available. These training schemes combine on-the-job training with college instruction, offering you the chance to work towards gaining relevant work-based qualifications such as the NVQ Level 2 Award in Manufacturing Sewn Products and the Level 3 Award in either Manufacturing Textile Products or Apparel Manufacturing Technology. As an apprentice, you will cover areas such as health and safety, the industry history, understanding materials, manufacturing techniques, the use of machinery and quality standards.

The Textile Institute (TI) also offers a range of globally recognised qualifications for professional development for those already working in the sector from licentiate to fellow level. ABC Awards offers a variety of courses in sewing, manufacturing and textiles, as do City & Guilds at Levels 1–3.

## What the work involves

Textile operatives manufacture carpets, prepare the yarns of fibres to be woven or knitted (which may involve carding and combing or chemical processing), spin yarn on a machine or even make fabric on a loom.

You will carry out basic maintenance on your machinery, make sure you have a supply of raw materials and keep your work area clean and tidy in accordance with health and safety regulations.

You may also work on finishing processes such as dyeing or waterproofing fabrics.

## Type of person suited to this work

You will need to be practical in order to operate the machinery skilfully and responsibly. In keeping with this, you should have good concentration as you will be doing repetitive tasks for long periods of time.

Manual dexterity and good spatial awareness, coupled with excellent eyesight and, usually, full colour vision, are also requirements for carrying out tasks such as spinning or weaving textiles.

A reasonable level of personal fitness, an understanding of, and adherence to, workplace health and safety rules,

and enjoyment of working in a team are also relevant attributes.

## Working conditions

Although you will work an average 37 to 40 hours a week, you will usually be doing shift work which is likely to involve early mornings or late evenings. Overtime and part-time work are also available.

You will usually work in a textile factory, which should be light and well ventilated, although the machines can be noisy and you will have to wear relevant safety equipment at all times.

It can be physically tiring, as you will spend the majority of your time standing over your machine or walking between the various pieces of equipment you are using.

## Future prospects

Transfer of textile production abroad, along with the increased use of machinery, means that there are potentially fewer textile operative jobs. However, as the textile industry has a prominently mature workforce, retirements from the industry mean jobs will continue to be available. To improve your chances of employment, you should be skilled in as many aspects of textile production as possible.

If you gain experience in using a variety of machines and performing a range of tasks, you will find your prospects improve accordingly.

You could also choose to move into quality control or sales once you have gained a full knowledge of the textile industry.

## Advantages/disadvantages

You will be putting your practical skills to good use creating a range of textiles for various purposes.

The work can become monotonous.

Hours can involve unsocial shift work in the early morning or evening.

## Money guide

Starting salaries are about £12,500. With experience and diverse skills, you could earn between £14,000 and £17,000.

Once you have become a multi-skilled senior operative you could earn up to £20,000.

If you work shifts, or undertake overtime, earnings could be higher. Piecework payments (awarded for high production volume) can also boost earnings.

## Related opportunities

- Costume Designer p156
- Fashion Designer/Milliner p157
- Tailor/Dressmaker p227

## Further information

**Society of Dyers and Colourists**  
[www.sdc.org.uk](http://www.sdc.org.uk)

**Textile Institute**  
[www.textileinstitute.org](http://www.textileinstitute.org)

### Qualifications and courses

One route of entry into a career as a toolmaker is via an apprenticeship. You will need at least 5 GCSEs/ National 5s (A\*-C/A-C) or equivalent, in relevant subjects including maths, English, a science, engineering, and design and technology in order to be considered.

Most people start on the Advanced Apprenticeship in Engineering scheme on completion of school or college either as an apprentice machinist or multi-skilled apprentice. You will typically experience a combination of on-the-job training from your employer and formal instruction in a college environment. Here you will also work towards gaining industry-recognised qualifications such as an NVQ Level 2 in Performing Engineering Operations, or Mechanical Manufacturing Engineering (Levels 2-3) or Level 3 in Engineering Toolmaking. Qualifications such as these will instruct you in turning, milling, grinding and drilling and your employer may also train you in the use of CNC machines.

Many companies aim to train multi-skilled craftspeople rather than specialists. Apprentices may learn fabrication skills (welding and metalwork), computer-aided design (CAD) or computer-aided manufacturing (CAM). Only exceptional trainees are encouraged to focus completely on toolmaking.

Alternatively, you may opt to gain some of the skills required of the profession by studying full time at college. Courses available include a BTEC Certificate/Diploma in Engineering (Levels 1-3), a City & Guilds Certificate in Engineering and an EAL Certificate/Diploma in Engineering (Levels 2-3).

### What the work involves

Toolmakers make specialist tools and devices that are used to cut, shape, mould and form various materials for use in the production of all items; ranging from domestic appliances to aeroplanes. You will work with a range of materials, including metals and plastics.

You will also be using complex engineering drawings as a guide to marking out and cutting each piece.

You will be operating a variety of machinery including drills, grinding and milling machines, cutting and pressing devices and, increasingly, computer numerically controlled (CNC) equipment.

### Type of person suited to this work

Good hand-to-eye coordination and a keen eye for detail will be beneficial, both when operating machinery and to check the quality of the tools produced. You will be making extremely precise devices, so it is essential to be able to spot any faults or errors before the tools are despatched to customers.

Good numerical skills and the ability to interpret complicated technical drawings are essential, both for making accurate calculations and creating precise parts.

Finally, you should have good IT skills as computer-operated machinery is increasingly used in this role.

### Working conditions

You will usually work 39 hours a week, Monday to Friday. Although some larger companies operate shift patterns so evening and weekend work may be necessary.

Work is usually undertaken in a tool room within a factory or workshop. This means that you will be working in a fairly quiet environment, away from the main factory machinery.

You will normally stand for the duration of your working day, which can be tiring. You will be required to wear appropriate safety equipment at all times.

### Future prospects

You will find your chances of securing work are enhanced if you have CNC machine skills as there is currently an increase in the number of computer-controlled machinery and precision casting techniques being used within the industry. The number of toolmakers in the industry has fallen due to this growth as workers struggle to deal with the introduction of new equipment and processes.

After gaining experience, you could move into a supervisory role within a company. This would involve overseeing production within a tool room or workshop. This could then lead into a senior or management position.

You could also undertake further qualifications in order to work towards employment as an engineering technician. This could then lead to you undertaking a degree course in order to become an engineer of some kind.

### Advantages/disadvantages

You will be making tools which are vital for the construction of important equipment; these range from aeroplanes to washing machines.

You will be using both your practical skills and your mental abilities daily.

The work can be physically exhausting, as you will spend the majority of your day on your feet.

### Money guide

Starting salaries range from £15,500 to £17,500 a year.

With experience, this can rise to £18,000-£24,000.

Highly skilled toolmakers, who are fully trained in using computer-controlled equipment, can earn £25,000-£35,000.

### Related opportunities

- Motor Vehicle Technician p218
- Sheet Metal Worker p226
- Welder p232

### Further information

#### Engineering Council UK

[www.engc.org.uk](http://www.engc.org.uk)

#### Semta

[www.semta.org.uk](http://www.semta.org.uk)

### Qualifications and courses

Vehicle maintenance patrollers are qualified vehicle technicians, and as such must hold NVQ Levels 1 and 2 in Motor Vehicle Maintenance and Repair along with having a minimum of 3 years of relevant experience in motor vehicle repair.

You will need a clean driving licence, and will have to pass a driving assessment, aptitude test and medical exam. For some positions, a LGV licence may be required. Most employers will expect you to have at least 4 GCSEs/National 5s (A\*-C/A-C), including English, Maths and a science.

Some of the larger organisations such as vehicle breakdown companies, dealerships and garages offer apprenticeship programmes that allow new entrants to train on the job and learn skills such as customer service techniques, road safety and use of communications equipment, alongside building their technical knowledge. Employers may also support you in your study of relevant industry recognised qualifications such as NVQs in Roadside Assistance and Recovery (Levels 2-3), City & Guilds Level 4 Certificate in Advanced Automotive Diagnostic Techniques (4121) or the IMI Awards Level 4 Diploma in Automotive Master Technician.

Your career prospects and earnings will be significantly enhanced if you work towards Institute of the Motor Industry's Automotive Technician Accreditation (ATA). You would be required to complete a number of practical and theory exams in order to gain status as a Roadside Assistance Diagnostic Technician or Roadside Assistant Master Technician.

### What the work involves

Vehicle maintenance patrollers travel to motorists who have broken down in order to diagnose the problem with the vehicle and fix it if possible. If repair is not possible, you will need to tow the vehicle to the nearest garage.

You will be responding to urgent calls from a central control centre, and may need to reassure worried or shaken motorists.

You will be driving a van or truck, and operating a range of electronic equipment alongside general tools and car parts.

### Type of person suited to this work

You will need excellent communication skills in order to explain to motorists what is wrong with their vehicle and what can be done to fix it. You may be required to reassure people who are distressed or upset following an accident.

The ability to think quickly when assessing vehicles at the roadside is necessary.

You should be good with your hands as you will be operating various tools and machines and undertaking repairs within the small space of an engine.

### Working conditions

An average working week comprises around 39 hours, usually worked on a shift system including evening, night and weekend work. You may also be required to remain on standby on occasion.

Since the majority of work is undertaken on the road, a driving licence is essential. Depending on the vehicle you drive, you may also need an additional HGV or LGV licence. You will be working on the roadside in all conditions, including hazardous weather such as snow and fog, so must wear relevant safety equipment at all times.

### Future prospects

Vehicle maintenance patrollers enjoy a variety of employment options. You could work for a large, well known national organisation such as the Royal Automobile Club (RAC) or the Automobile Association (AA), or for a smaller garage providing a localised breakdown service.

With experience you may progress to a supervisory role in a larger organisation, in which you will oversee and develop the performance of a number of breakdown engineers across a region.

In larger organisations, you could also move into a managerial or senior administrative position.

### Advantages/disadvantages

You will be providing a valuable and appreciated service to people every day.

There is great job satisfaction in being able to repair a vehicle at the roadside and send a happy customer on their way.

You will spend long periods of time on your own, which can get boring and lonely.

### Money guide

The starting salary for a qualified vehicle breakdown engineer is around £13,000 to £18,000 per year.

With 3 to 5 years' experience, you could expect to earn in excess of £30,000.

The specialist skills you acquire, such as the ability to use lifting equipment to move a stranded vehicle, are likely to increase your pay. Shift work and overtime can also affect your earnings.

### Related opportunities

- Assembler p197
- Highways Maintenance/Road Worker p89
- Motor Vehicle Technician p218

### Further information

**Royal Automobile Club**  
[www.rac.co.uk/careers](http://www.rac.co.uk/careers)

**The Automobile Association**  
[www.theaa.com](http://www.theaa.com)

**The Institute of Vehicle Recovery**  
[www.theivrgroup.com](http://www.theivrgroup.com)

## Qualifications and courses

One route of entry into a career as a professional welder is via an Apprenticeship or Advanced Apprenticeship in Engineering. Most employers expect you to have least 5 GCSEs/National 5s (A\*-C/A-C) or equivalent, including Maths, English and a science subject. You may have to pass a competency test prior to entry.

As an apprentice, you will experience a combination of on-the-job training from experienced professionals and a series of day or block release instruction at a college or training centre where you will work towards gaining industry recognised qualifications. Relevant courses include NVQs in Performing Engineering Operations (Levels 1–2) and in Fabrication and Welding Engineering (Levels 2–3). Your training will cover areas such as how to read technical drawings, how to select materials and tools whilst also teaching you the relevant welding methods required of your specific job role.

Alternatively, you may opt to study for related qualifications full time at college in order to gain knowledge prior to entering the industry. Relevant qualifications include the ABC Certificate in Fabrication and Welding Practice (Levels 1–3), the BTEC Level 3 Diploma in either Manufacturing Engineering (Fabrication & Welding) or Mechanical Engineering, the City & Guilds Award in Welding Skills (Levels 1–3), the City & Guilds Certificate in Engineering (Levels 1–3), the Welder Approval Certificate and the EAL Award in Welding.

To enhance your career prospects and future earnings, you may decide to seek membership with The Welding Institute (TWI) which offers professional welders the chance to apply for chartered (CEng) or incorporated (IEng) engineering status or registration as an engineering technician (EngTech).

## What the work involves

Welders work with metals and heavy duty plastics, which they join together using heat to form plates, pipes and other items.

You could use a number of welding techniques that are classed as either manual, semi-automatic or fully mechanised. You will most likely specialise in one of these areas as opposed to working across all 3.

You may have to work from technical drawings, using them as a guide by which to weld components together.

## Type of person suited to this work

You will need good hand-to-eye coordination, coupled with manual dexterity, to successfully operate your tools and machinery.

You should be willing to work responsibly within strict health and safety guidelines, and to look out for the safety of others in your team. This will prove especially important when you work unsupervised.

## Working conditions

Hours are usually 37 a week, often operating on a shift pattern, and opportunities for overtime are common.

You could find yourself working in almost any location, from standard factory or workshop roles to on-site jobs which could be outdoors or even under the sea. This means you might have to work in confined spaces which can be uncomfortable.

You will also need to wear safety equipment, including protective goggles to shield your eyes from UV light and sparks, and also fire-resistant aprons and gloves.

## Future prospects

There are excellent employment opportunities for welders throughout the UK due to a shortage of skilled welders, although the majority of jobs are found in the more industrial areas.

There is a great variety of industries in which you could work, including civil engineering, agricultural engineering, shipbuilding and vehicle maintenance and repair. As your skills are transferable, you will find it easy to move between different fields of work as well as overseas.

As you gain experience within a company, you could move into a supervisory role such as a foreman/forewoman or a fabrication workshop manager. Alternatively, you could undertake further qualifications in order to specialise in a particular area of welding, move into inspection and quality control or work towards a career as an engineer.

Contract work and self-employment are also common.

## Advantages/disadvantages

Practical work, where you can see the result of your efforts, is extremely rewarding.

Career prospects are good, with opportunities throughout the UK.

You will be operating machinery that is potentially dangerous.

## Money guide

Starting salaries are usually between £12,500 and £17,000.

With experience you could earn in the region of £18,000–£26,000 a year.

If you are working as a specialist welder you could earn in excess of £30,000 a year.

## Related opportunities

- Blacksmith p198
- Civil/Construction Engineer/Civil Engineering Technician p69
- Sheet Metal Worker p226

## Further information

**Engineering Construction Industry Training Board**  
www.ecitb.org.uk

**The Welding Institute**  
www.twi-global.com

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