

City & Guilds Level 2 Diploma in Electrical Power Engineering (2304- 21)

June 2021 Version 1.2

Qualification Handbook

Qualification at a glance

Subject area	Electrical Power Engineering
City & Guilds number	2304
Age group approved	16+
Entry requirements	None
Assessment	Portfolio of evidence
Approvals	Automatic Approval
Support materials	Centre handbook Unit pack
Registration and certification	Consult the Walled Garden/Online Catalogue for last dates

Title and level	City & Guilds number	Accreditation number
City & Guilds Level 2 Diploma in Electrical Power Engineering	2304-21	603/7184/5

Version and date	Change detail	Section
1.0 February 2021	First published	
1.1 February	SCQF credits removed, and titled amended	
1.2 June 2021	Added City & Guilds to titles, added Pass/fail statement to section 4 and added an reasonable adjustments statement	

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1 Introduction

This document tells you what you need to do to deliver this qualification:

Area	Description
Who is are this qualification for?	This qualification is for those who are wishing to enter or are already working within the power industry. They could be undertaking an Apprenticeship such as The Power Network Craftsperson, wishing to demonstrate competence or progress to a more advanced role.
What does the qualification cover?	This qualification will allow candidates to learn, develop and practise the skills required for employment and/or career progression in the power industry.
What opportunities for progression are there?	They allow candidates to progress into employment or into a management opportunity.
Who did we develop the qualification with?	Power sector employers and the Sector Skills Council Energy & Utility Skills (EU Skills).
Is it part of an apprenticeship framework or initiative?	This qualification supports the Power Network Craftsperson Standard.

Structure

To achieve the City & Guilds Level 2 Diploma in Electrical Power Engineering, learners must select one of three available pathways:

- Overhead Lines
- Substation Plant
- Underground Cables

Below is a summary of the minimum requirements for each pathway:

- To achieve the Level 2 Diploma in Electrical Power Engineering - **Overhead Lines** pathway, learners must achieve mandatory units 201, 202 and 203, plus a minimum of two units from optional units 204 – 212, plus a minimum of 4 units from optional units 225 – 248.
- To achieve the Level 2 Diploma in Electrical Power Engineering - **Substation Plant**, learners must achieve mandatory units 201, 202 and 203, plus a minimum of two units from optional units 213 - 219, plus a minimum of 4 units from optional units 225 – 248.
- To achieve the Level 2 Diploma in Electrical Power Engineering - **Underground Cables**, learners must achieve mandatory units 201, 202 and 203, plus a minimum of two units from optional units 220 - 224, plus a minimum of 4 units from optional units 225 – 248.

	City & Guilds unit number	Unit title	GLH
Mandatory			
	201	Working safely in the power sector	24
	202	Working efficiently and effectively in the power sector	12
	203	Using and communicating technical information in the power sector	18
Optional – Overhead Lines			
	204	Install overhead steelwork, fittings and conductors on wood pole structures	90
	205	Dismantle overhead steelwork, fittings and conductors on wood pole structures	90
	206	Install and configure distribution apparatus on wood pole structures	90
	207	Fault repair of overhead line distribution assets	120

	223	Repairs to faulted or damaged Low Voltage service and mains cables (non-diagnosis)	120
	224	Repairs to faulted or damaged High Voltage cables (non-diagnosis)	120

	City & Guilds unit number	Unit title	GLH
Optional – All pathways			
	225	Movement of cable, plant and apparatus	36
	226	Access, egress and movement in substations	24
	227	Electrical and functional testing of fitting plant and apparatus	36
	228	Inspection and maintenance of battery systems	48
	229	Substation earthing installation and testing	48
	230	Inspection of substation plant and apparatus	36
	231	Maintain compressed air systems	36
	232	Location and identification of underground utility services	24
	233	Access and egress and movement within the working area	12
	234	Electrical testing of underground cables and apparatus	36
	235	Carry out excavation activities on underground cables	24
	236	Inspect the installation of underground cables	24
	237	Install underground cables	24
	238	Carry out jointing on pilot/telephone cables	48
	239	Carry out jointing on low voltage concentric cables	48

	240	Carry out jointing on low voltage consac cables	48
	241	Movement of overhead line plant and apparatus	60
	242	Access and egress and work on wood pole structures	48
	243	Access and egress and work on steel tower structures	48
	244	Excavate and install distribution wood poles and stays	36
	245	Electrical testing of overhead line distribution equipment	36
	246	Inspection of overhead line wood pole networks	24
	247	Earthing of overhead line conductors on steel tower structures	36
	248	Jointing of overhead line Extra High Voltage conductors	36

Total Qualification Time

Total Qualification Time (TQT) is the number of notional hours which represents an estimate of the total amount of time that could reasonably be expected for a learner to achieve and demonstrate the achievement of the level of attainment necessary for the award of a qualification.

TQT is comprised of the following two elements:

- 1) The number of hours which an awarding organisation has assigned to a qualification for Guided Learning, and

An estimate of the number of hours a Learner will reasonably be likely to spend in preparation, study or any other form of participation in education or training, including assessment, which takes place as directed by - but, unlike Guided Learning, not under the Immediate Guidance or Supervision of - a lecturer, supervisor, tutor or other, appropriate provider of education or training.

Title and level	GLH	TQT
City & Guilds Level 2 Diploma in Electrical Power Engineering - Overhead Lines	188	500
City & Guilds Level 2 Diploma in Electrical Power Engineering - Substation Plant	118	330
City & Guilds Level 2 Diploma in Electrical Power Engineering - Underground Cables	188	500

2 Centre requirements

Approval

To offer this qualification, new centres will need to gain both centre and qualification approval. Please refer to the City & Guilds Centre Manual for further information.

Centres approved to offer qualifications in Electrical Power Engineering 2339-21 to -23 will have automatic approval for the Level 2 Diploma in Electrical Power Engineering 2304-21.

Automatic approval is available for 12 months from the launch of the qualification. After this time, the qualification is subject to the standard Qualification Approval Process. It is the centre's responsibility to check that automatic approval is still current at the time of application.

For any other cases, centres will need to gain both centre and qualification approval. Please refer to the Centre Manual - Supporting Customer Excellence for further information. Centre staff should familiarise themselves with the structure, content and assessment requirements of the qualifications before designing a course programme.

Resource requirements

Centre staffing

City & Guilds quality assurance includes initial centre approval, scheme approval, the centre's own procedures for monitoring quality and City & Guilds' ongoing monitoring by an External Verifier.

City & Guilds External Verifiers will:

- ensure that internal verifiers are undertaking their duties satisfactorily
- monitor internal quality assurance systems and sampling assessment activities, methods and records
- act as a source of advice and support
- promote best practice
- provide prompt, accurate and constructive feedback to all relevant parties on the operation of centres' assessment systems.

In line with the Sector Skills Council Energy & Utility Skills' assessment strategy, all assessors, internal verifiers and external verifiers involved in the delivery of power sector qualifications (within which the renewables sector falls) must:

Assessors:

- must hold, or be working towards, valid assessor qualifications as defined by the Qualification Regulator
- must be occupationally competent in the units they are assessing. Centres must evidence that the assessor has achieved the award (or equivalent), at or above the level they are assessing. Alternatively, they must provide supporting evidence that they are able to make valid judgments through experience built up by working in the industry
- must have a working knowledge of the qualification and a full understanding of that part of the award for which they have responsibility for

- must demonstrate current evidence of continuing professional development in a relevant area of practice.

Internal verifiers:

- must hold a valid internal verifier qualification or be working towards suitable qualifications for internal verification, as defined by the Qualification Regulator(s)
- must be occupationally competent in the units they are assessing. Centres must evidence that the internal verifier has achieved the award (or equivalent), at or at or above the level they are verifying, or provide supporting evidence that they are able to make valid judgments
- must have a working knowledge of the qualifications they are internally verifying
- must be either working in the appropriate sector itself OR they must be able to demonstrate they possess practical and up-to-date knowledge of current working practices appropriate to the sector in which they are carrying out verification activities
- Must demonstrate current evidence of continuing professional development in a relevant area of practice.

External verifiers:

- must be familiar with the industry; have up-to-date working knowledge /experience of the technical processes and terminology for which they provide external verification. If appropriate, this experience could be evidenced through professional registration
- must hold valid qualifications in assessment and internal verification and hold, or be working towards valid qualifications for external verification, as defined by the Qualification Regulator.
- must demonstrate current evidence of continuing professional development in a relevant area of practice.

Centre staff may undertake more than one role, e.g tutor and assessor or internal verifier, but must never internally verify their own assessments.

Learner entry requirements

City & Guilds does not set entry requirements for this qualification, although it is expected that candidates will be already engaged within the industry. Candidates should not be registered if they hold from City & Guilds or another awarding body a qualification of a similar level and within the same content area as the relevant qualification.

Age restrictions

City & Guilds cannot accept any registrations for candidates under 16 as this qualification is **not** approved for under 16s.

3 Delivering the qualification

Initial assessment and induction

An initial assessment of each candidate should be made before the start of their programme to identify:

- if the candidate has any specific training needs,
- support and guidance they may need when working towards this qualification.
- any units they have already completed, or credit they have accumulated which is relevant to this qualification.
- the appropriate type and level of qualification.

We recommend that centres provide an induction programme, so the candidate fully understands the requirements of the qualification[s], their responsibilities as a candidate, and the responsibilities of the centre. This information can be recorded on a learning contract.

Support materials

The following resources are available for this qualification:

Description	How to access
Unit pack	www.cityandguilds.com

Recording documents

Candidates and centres may decide to use a centre devised paper-based or electronic method of recording evidence.

City & Guilds endorses several ePortfolio systems, including our own, **Learning Assistant**, an easy-to-use and secure online tool to support and evidence learners' progress towards achieving qualifications. Further details are available at: www.cityandguilds.com/eportfolios.

City & Guilds has developed a set of *Recording forms* including examples of completed forms, for new and existing centres to use as appropriate. *Recording forms* are available on the City & Guilds website.

Although new centres are expected to use these forms, centres may devise or customise alternative forms, which must be approved for use by the external verifier, before they are used by candidates and assessors at the centre. Amendable (MS Word) versions of the forms are available on the City & Guilds website.

Reasonable Adjustments & Access Requirements

The City & Guilds Centre Manual and website contain information about the City & Guilds approach to reasonable adjustments and access requirements.

4 Assessment

Summary of assessment methods

This qualification is graded pass / fail.

This section is broken down into the following assessment sub-sections:

- General – provides the overall approach to assessment in the qualification
- Work-place assessment - description of what is required of the assessment
- Simulation - the criteria and minimum requirements pertaining to this form of assessment
- Realistic working environments - the activities and criteria relating to this form of assessment
- Witness testimony - sector skills council's guidance on this form of evidence
- Knowledge and understanding - guidance on the approach to assessing these criteria

General

This new qualification is accredited as a competence-based qualification and require the overwhelming majority of evidence to be collected from the workplace. The assessment methods therefore have not deviated from the previous qualification, where evidence to meet the requirements of the standards was gathered by the candidate from the work-place and compiled into a portfolio of evidence, which was validated by the approved assessor and internal verifier and subject to City & Guilds' external verification.

The qualification has been designed to offer choices and progression which recognise candidate competence in working within the three main occupational contexts overhead line work, underground cable work and substation work. There is significant inter-location variation in the specific items of plant, apparatus and equipment with which candidates must interact within each of these contexts. Both candidates and assessors therefore must have a detailed knowledge of the specific operational characteristics of the plant, apparatus and equipment with which they work in order to be able to demonstrate, through its use, their achievement of occupational competence as demanded by the units of assessment.

Details of the scope and range of the unit are provided with each unit. In addition to visits from external verifiers, all centres will be required to submit details of assessment planning arrangements and assessment recording forms and systems - these details must include the planned use and design of simulations that meet the requirements on this type of assessment provided below. The external verifier will determine whether or not these are of an acceptable rigour to ensure satisfactory implementation and recording of assessment. The visits to a centre by an external verifier will be planned in advance.:

The following approaches to external quality control are not mandatory as part of the assessment strategy:

- Use of independent assessors (moving the candidate): The requirement for workplace evidence means that it would be inappropriate and logistically uneconomic to make use of an assessment system in which candidates were required to attend a different location or assessment centre.
- Use of independent assessors (moving the assessor): Candidates for the Electrical Power Engineering qualifications will typically be in low numbers per centre and widely scattered across the UK. Under these circumstances, the mandatory use of peripatetic assessors would be very costly and offer little added value.
- Use of independent assessment methods (open written response assessment): Due to the variation of plant, apparatus and equipment this type of assessment would remove the flexibility to assess knowledge at a local level.

Work-place assessment

It is expected that all the evidence from the candidate's performance will be drawn from workplace practice and recorded on centre devised documentation. This evidence must show candidates meet the performance criteria consistently in their work, over a period of time. The evidence will also materialise from different workplace situations and be varied in nature - work products, records, discussions as well as observation of, and commentaries on, candidate behaviour.

All of the performance and knowledge criteria for each unit must be evidenced, along with the prescribed scope, range and performance requirements.

It is recommended that effective use be made of available opportunities for evidence collection in line with the following principles:

- Evidence must be valid and genuinely produced by or about the candidate
- Evidence from a range of sources will normally be preferable to repeated examples of evidence from a single source - sole use of one type of evidence will need to be justified
- Assessors should pay due regard to the cost-effectiveness of using varied sources of evidence when planning assessments with a candidate

Simulation

The sector skills council (EU Skills) defines simulated activities as those which are carried out without the environment, resources or equipment found within the workplace and involve acting or other scenarios which are not 'real' work tasks. EU Skills has not identified any specific areas in the distribution qualification that warrant assessment through simulation, however, in the extremely rare instance where it is felt that simulation is required this is only acceptable in relation to those few instances which display one or more of the following characteristics (details of planned simulation must be submitted for approval by centres to their external verifier):

- where health and safety could be compromised by seeking workplace evidence
- where the behaviour or situation under which assessment occurs happens infrequently in the workplace
- where the electricity network, plant or apparatus needs to be placed in an unacceptable operating state to allow for assessment to take place.
- In all cases where the use of evidence from simulations is permitted, this is clearly detailed in the element or unit concerned.

Where simulation is used the environment must be set up to mirror the features of an electricity distribution environment in all of the following aspects:

- nature of the plant, apparatus and equipment
- ambient noise, light and temperature levels
- handling characteristics of materials used
- presence, actions and capabilities of other personnel

Where simulation is used the simulated activity must be designed to mirror the same activity carried out in an electricity distribution environment:

- The urgency with which the activity must be carried out and the time needed to complete it
- The number and sequence of actions needed to complete the activity
- The skills needed to carry out the activity
- The nature and availability of resources needed to carry out the activity
- Access to references and sources of advice and assistance that could be needed if problems arise
- The type of documentation to be completed
- The standards to which the activity must be carried out, including any practices and procedures which require to be followed
- The outcomes which the activity will produce.

Realistic working environments (RWE)

The SSC has provided the following contexts for illustration where assessment in an RWE might be used:

- Where demonstration of emergency shutdown and related safety procedures would be **dangerous and/or disruptive** to plant/environment/individuals; **too costly** such as total plant shutdown or dealing with spillage of dangerous substances; where **issues of confidentiality** restrict access to real work opportunities
- Demonstrating specific aspects of the operation which rarely or never occur because of effective quality assurance systems
- The capacity to integrate disparate knowledge to cope with unforeseen events and to solve problems
- Aspects of working relationships and communications for which no opportunity has presented for the use of naturally occurring workplace evidence of candidate performance

Although it is expected that candidates provide all evidence from the work place, the SSC has identified the following types of activities as being potentially suitable for assessment through RWE (these **details of planned simulation must be submitted for approval by centres to their external verifier**):

1. Planning and preparing for emergency response
2. Isolation of the fault and contingency action
3. Fault diagnosis and problem causation

The following conditions for assessment in an RWE **must** be met:

1. Assessments must be carried out under realistic work pressures that are found in the normal industry workplace
2. Assessments must be carried out in conditions and facilities which are typical of those encountered in the normal industry workplace
3. The range of materials, equipment and tools that candidates use must be up-to date and be of the type routinely found in the normal industry workplace environments.
4. All work carried out should be completed in a way, and to a timescale, that is acceptable in the normal industry workplace
5. Candidates must interact with the range of personnel and contractors found in the normal industry workplace
6. Candidates must be expected to achieve a volume of work comparable to that expected in the normal work situation being replicated
7. Candidates must be given workplace responsibilities that will enable them to meet the requirements of the National Occupational Standards / units of assessment

8. Candidates must show their productivity reflects that found in the work situation being replicated
9. The RWE must take into account legislation, regulations, codes of practice, etc, which pertain to the regulated environment

The RWE must be managed as a real work situation

- assignments, including different versions (stock code...)
- a practice or sample assignment, which can be downloaded from the SmartScreen website

Witness testimony

The SSC supports the use of witness testimony as a natural and efficient way of **contributing** to a candidate's source of evidence of competence. Nonetheless, the quality of this type of evidence will be affected by knowledge the witness has about the qualification requirements and their own competence in the occupational role.

As a minimum, witnesses should be:

- Fully briefed and clear about the purpose and use of the testimony
- Able to demonstrate they have the necessary expertise in the occupational area for which they are providing testimony

Witnesses should be:

- Occupationally competent in the functions covered by the units to which they are contributing. This competence will have been gained by working within the energy and utilities sector.
- Maintaining their occupational competence by engaging in continuing professional development activities to keep up to date with developments and changes taking place within the energy and utilities sector.
- Working currently, or within the last year, in a post directly related to the qualification units they are witnessing.
- Familiar with the national occupational standards / units of assessment and be able to interpret current working practices and technologies within the area of work.
- Have had an appropriate induction to the Energy & Utility Skills national occupational standards, the awarding body, and assessment centre requirements and have ongoing support by way of access to updating and other issues connected with the qualification.

Knowledge and understanding

The requirement to prove competency is through skills, knowledge and understanding and as such all of the units within the distribution qualification contain knowledge and understanding criteria that must be evidenced to achieve the full qualification.

Evidencing the knowledge and understanding - the criteria of which are qualified by company policies and procedures; legislation and regulations – can come through natural performance, professional discussion or oral questioning. All knowledge and understanding assessment methods must be recorded along with the candidate's answers and/or outcomes - where a component of knowledge and understanding is common across more than one unit, there is no need to assess it independently in relation to each unit.

The use of questioning to probe candidate competence in relation to rare or dangerous occurrences should be undertaken only when the use of realistic simulations to address the same competence cannot practically be applied. In all cases, simulation accompanied by oral questioning should be preferred to questioning alone. The use of oral rather than written questioning is recommended to allow assessors the flexibility to investigate those aspects of a candidate's knowledge and understanding alongside evaluation of other forms of evidence.

Recording forms

Candidates and centres may decide to use a paper-based or electronic method of recording evidence - City & Guilds endorses several e-Portfolio systems. Further details are available at: www.cityandguilds.com/eportfolios.

Accreditation of prior learning and experience (APEL)

Accreditation of Prior Learning (APL) and Accreditation of Prior Experience and Learning (APEL) recognise the contribution a person's previous experience could contribute to a qualification.

As this qualification is specifically related to the Power sector it is not expected that candidates will present with APEL. However, and in line with the sector skills council Energy & Utility Skills' assessment strategy, City & Guilds supports the use of other qualifications as valuable contributions to evidence of competence.

Where APEL is sought the centre must first confirm this with the external verifier or seek their advice where there is uncertainty.

5 Units

Availability of units

All units can be found in the separate unit pack.

Appendix 1 Sources of general information

Access to Assessment & Qualifications provides full details of the arrangements that may be made to facilitate access to assessments and qualifications for candidates who are eligible for adjustments in assessment.

The **centre homepage** section of the City & Guilds website also contains useful information on such things as:

- **Walled Garden:** how to register and certificate candidates on line
- **Events:** dates and information on the latest Centre events
- **Online assessment:** how to register for e-assessments.

Centre Guide – Delivering International Qualifications contains detailed information about the processes which must be followed and requirements which must be met for a centre to achieve ‘approved centre’ status, or to offer a particular qualification. Specifically, the document includes sections on:

- The centre and qualification approval process and forms
- Assessment, verification and examination roles at the centre
- Registration and certification of candidates
- Non-compliance
- Complaints and appeals
- Equal opportunities
- Data protection
- Frequently asked questions.

Linking to this document from web pages

We regularly update the name of documents on our website, therefore in order to prevent broken links we recommend that you link to our web page that the document resides upon, rather than linking to the document itself.

www.cityandguilds.com

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If this page currently occupies an EVEN numbered page, leave it here and delete this note.

If your document has an ODD number of pages, please remove this page, to allow the back cover to fall on the left-hand page (even number).

Useful contacts

UK learners

General qualification information

E: learnersupport@cityandguilds.com

International learners

General qualification information

E: intcg@cityandguilds.com

Centres

Exam entries, Certificates, Registrations/enrolment, Invoices, Missing or late exam materials, Nominal roll reports, Results

E: centresupport@cityandguilds.com

Single subject qualifications

Exam entries, Results, Certification, Missing or late exam materials, Incorrect exam papers, Forms request (BB, results entry), Exam date and time change

E: singlesubjects@cityandguilds.com

International awards

Results, Entries, Enrolments, Invoices, Missing or late exam materials, Nominal roll reports

E: intops@cityandguilds.com

Walled Garden

Re-issue of password or username, Technical problems, Entries, Results, e-assessment, Navigation, User/menu option, Problems

E: walledgarden@cityandguilds.com

Employer

Employer solutions including, Employer Recognition: Endorsement, Accreditation and Quality Mark, Consultancy, Mapping and Specialist Training Delivery

E: business@cityandguilds.com

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