QUALIFICATION SPECIFICATION

ECITB Level 3 Diploma in Engineering Design and Draughting (RQF)

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Revisions to this document

The table below sets out all revisions made to this document since it was first issued, and the dates on which the revisions were effective from.

Version	Revision	Page	Effective date
RV2-2	Section 1.4 'Language of Assessment' added	4	01.11.26
	ECITB address removed under Section 3 – Further Information	16	

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1. Introduction

1.1 Objective and overview

The objective of this vocational competence qualification is to provide recognition that a candidate has demonstrated the required level of technical competence to work as an engineering design and draughting technician on projects in sectors such as engineering, manufacturing, construction, infrastructure, pharmaceuticals, utilities, transport and defence.

Successful completion of the qualification pathway will lead to the candidate being awarded an:

- ECITB Level 3 Diploma in Engineering Design and Draughting (RQF)

The qualification is based on National Occupational Standards (NOS) and has been designed following consultation with industry employers and stakeholders on a qualifications strategy which allows for a wider use of off the job assessment and to further sector needs to improve transferability of skills across the different sectors that comprise the industry. The detail and scope of the assessment criteria within this qualification has been developed by the Engineering Construction Industry Training Board (ECITB) Standards Setting Organisation in conjunction with employers, trainers, and assessors through workshops and consultations.

1.2 Engineering design and draughting technicians

Engineering design and draughting technicians produce designs and drawings for structures, piping, electrical systems, control and instrumentation systems and mechanical components used in industrial and commercial construction. Typically, jobholders work in a wide range of industries of national importance including power (coal, gas, nuclear, wind and other renewables), infrastructure (water, road, rail), petrochemical, oil and gas, steel, food and drink processing and manufacturing (aerospace, maritime, vehicle).

Jobholders are based at office locations within project design teams and occasionally work at on-site locations. They are required to understand on-site hazards and health and safety requirements and consider them in their designs.

Design and draughting plays an important part in driving forwards innovation in engineering and it is important that jobholders continually learn and keep up to date with changes and innovations in materials, technology and software and are able to think innovatively and communicate effectively.

The jobholder must: understand technical drawings and specifications and be able to create their own; identify factors likely to affect design decisions; consider health, safety and environmental implications when evaluating design options; produce CAD (computer aided design) models and engineering drawings and; be able to communicate design information to internal and external parties. Most will begin with minor amendments to existing drawings or designs and will be expected to take on increasingly complex tasks as their knowledge and experience increases. They will be required to develop design options as solutions to engineering problems, evaluate the options and recommend the most effective solution as well as producing the drawing/model.

Engineering design and draughting technicians are overseen by an Engineering Design Manager. They are responsible for the quality of their own work, possibly others' and should be able to check and correct drawings, following procedures and completing essential documentation at all times. They work on various types of plant and systems dependent on their company sector and typically specialise in one of the following: electrical, instrumentation and control, mechanical, piping or civil/structural.

1.3 Entry requirements

There are no mandatory entry requirements. However, due to the level and complexity of the subject, it is recommended that candidates should have attained GCSE grade "C/5" or above or RQF functional skills level 2 or above in English (Language) and mathematics or are able to demonstrate evidence of other suitable attainment or experience. A candidate's individual circumstances will determine if this qualification is appropriate and the approved centre will work with the prospective candidate and, where appropriate, the employer to determine suitability for the qualification.

1.4 Language of Assessment

This qualification is available and assessed in English only.

Centres must ensure, prior to registration, that candidates have a sufficient standard of English language competence to understand the qualification requirements, access learning and assessment materials, communicate effectively, and generate evidence that meets the required assessment standards. This applies particularly to candidates for whom English is not their first language.

A candidate's English language ability must be sufficient to enable them to demonstrate the required knowledge, skills, and behaviours independently, without the need for translation or language support that could compromise the validity or reliability of the assessment. Candidates must also be able to communicate effectively in workplace and assessment environments and carry out activities safely and appropriately in accordance with qualification requirements.

1.5 Achievement

This qualification consists of 7 mandatory units and a candidate must successfully meet the requirements of all 7 units in order to attain this qualification. This document details the learning outcomes and assessment criteria that a candidate must meet in order to demonstrate the acquisition of the knowledge, skills and behaviours (KSBs) to be awarded a vocational ECITB Level 3 Diploma in Engineering Design and Draughting (RQF).

The contents of each unit interrelate and therefore, the Awarding Organisation (AO) does not issue certificates for completion of standalone units.

1.6 Assessment

Assessment is through a combination of ECITB AO online knowledge tests; skills assessment reports (SARs) (researched assignments and reports which provide evidence of skills based either on 'live' workplace projects or simulated workplace/case study projects and experience); mandatory observation and; recorded technical discussions and/or presentations. All assessment is carried out by assessors approved by the AO.

1.6 Total qualification time, level and duration

The total qualification time (TQT) and guided learning for this qualification is in the table below, the total TQT is 1,322 hours. The amount of time taken to achieve this Level 3 Diploma is typically 36 months.

Units	Guided learning (hours)	Total qualification time (hours)
Unit DD01 Undertake design and draughting activities in accordance with health, safety, environmental and ethical requirements	30	80
Unit DD02 Undertake design and draughting activities with effective communication, procedures and behaviours	20	72
Unit DD03 Understand the design requirements by interpreting technical information	60	120
Unit DD04 Identify, evaluate and understand factors affecting technical design	60	105
Unit DD05 Generate creative engineering concepts and design options to solve technical challenges	40	90
Unit DD06 Evaluate engineering design options to determine the most effective solution	50	103
Unit DD07 Complete engineering designs, produce and handover the final design package	308	752
TOTAL	568	1,322

1.7 Equal opportunities, reasonable adjustments and special considerations

For information about fair assessment, equal opportunities, reasonable adjustments and special considerations please refer to the ECITB AO Policies and Procedures published on the ECITB website.

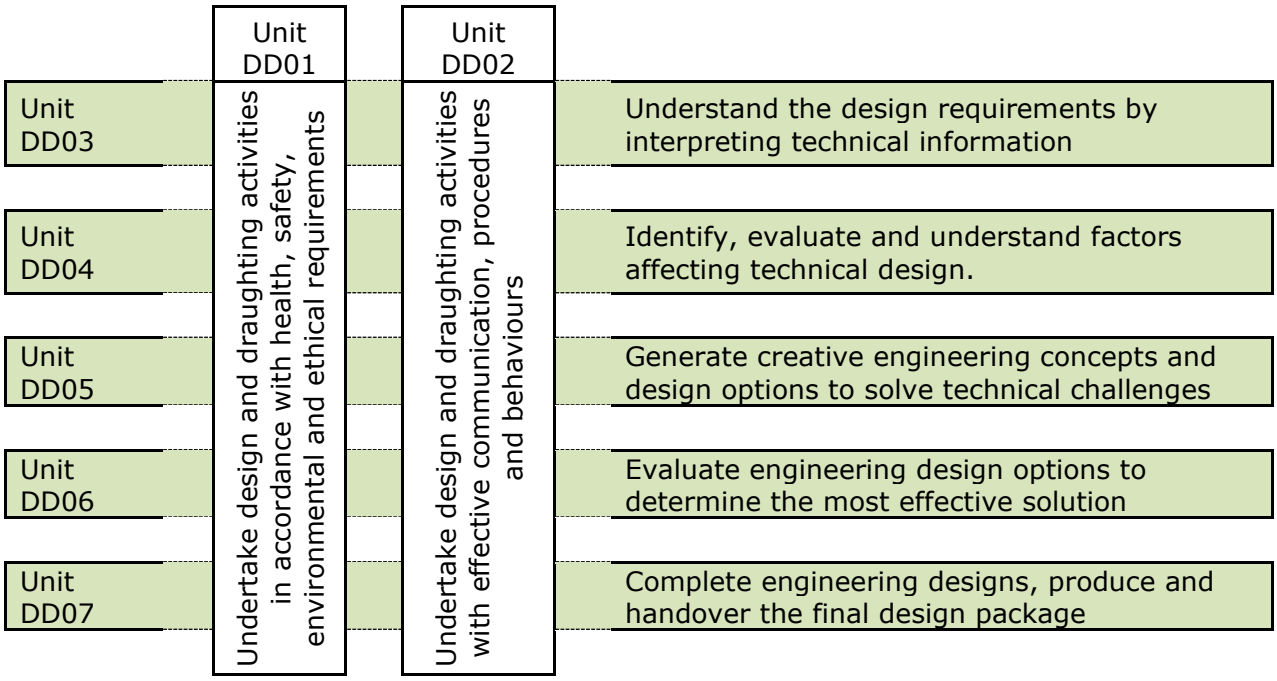
1.8 Career development within design and draughting

Successful completion of this qualification and additional work experience can lead to a career as a design technician. This, combined with experience and further learning may eventually lead to a career as a design engineer.

For more information about career progression, you can go to the ECITB website www.ecitb.org.uk

2. Qualification units and scope of assessment

2.1 Overview of this qualification



This design and draughting qualification consists of 7 mandatory units.

Knowledge, skills and behaviours (KSBs) within units DD01 and DD02 are an integral part of the learning outcomes of the other units and, as such, some of the skills relating to: health, safety and governance; quality management, procedures, data security and confidentiality; and effective communication are also expected to be demonstrated by candidates through the skills assessment tests for units DD03 to DD07.

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Unit DD01 Undertake design and draughting activities in accordance with health, safety, environmental and ethical requirements

Learning outcomes:

1. The candidate can identify and assess factors, including health, safety and environmental legislation and environmental sustainability that affect design and draughting and understands how to minimise risk to life, property and the environment.
2. The candidate understands codes of conduct and the importance of ethical working and the need to undertake activities in a way that contributes to professionalism.

Knowledge assessment criteria:
The candidate must demonstrate an understanding of the following in order to satisfy the skills assessment criteria:

HEALTH AND SAFETY LEGISLATION AND REGULATIONS AND MINIMISING RISK TO LIFE, PROPERTY AND THE ENVIRONMENT

K1.1 The statutory requirements of the main health and safety and environmental legislation and regulations relevant to design and draughting.

K1.2 The purpose of a risk control strategy including risk assessments, method statements, and permit to work systems, and the relevance of local procedures and guidance notes.

K1.3 What risk is in relation to health and safety, its importance and the consequences of poor risk management.

K1.4 The consequences for employers and employees of not fulfilling their legal health and safety and environmental responsibilities.

K1.5 How the role of a design and draughting technician impacts on the environment and how this impact can be reduced including:

a. The importance of using resources efficiently and effectively.

K1.6 Within the context of design and draughting:

a. What a hazard is and common types of hazard.
b. The effects of hazards on persons, property and the environment.
c. How to minimise the risks from different hazards.

Skills assessment criteria:
The candidate must demonstrate the ability to:

SKILLS FOR MINIMISING RISK TO LIFE, PROPERTY AND THE ENVIRONMENT

S1.1 Consider health, safety and the environment when undertaking tasks as a design and draughting technician, complying with statutory health and safety and other relevant guidelines and procedures.

S1.2 Demonstrate consideration of environmental sustainability in solutions, designs and drawings.

S1.3 Identify potential hazards and assess the level of risk involved – in the context of designs and drawings.

S1.4 Minimise risk to health, safety and the environment within the context of the role.

SKILLS FOR ETHICS

S1.5 Demonstrate integrity throughout delivery of design and draughting activities (assessed through units DD03-07).

S1.6 Maintain a duty of care towards all stakeholders.

S1.7 Keep informed about the professional ethics that should be applied.

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ETHICS K1.7 The purpose of ethics in a typical workplace including what working ethically means in terms of: treating all people fairly and with respect and; displaying honesty, integrity, accuracy and rigour. K1.8 Codes of conduct, including professional codes of conduct relevant to the role of design and draughting. K1.9 How international factors may affect ethical behaviour and communications.	

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Unit DD02 Undertake design and draughting activities with effective communication, procedures and behaviours

Learning outcomes:

1. The candidate understands quality management, procedures, data security and confidentiality and related procedural requirements, and can demonstrate these as required to carry out the job of a design and draughting technician effectively.
2. The candidate is able to communicate designs effectively.
3. The candidate can establish and maintain productive working relationships. (This includes reporting lines and workplace responsibilities.)
4. The candidate is able to work effectively by demonstrating all workplace desirable behaviours.

Knowledge assessment criteria:
The candidate must demonstrate an understanding of the following in order to satisfy the skills assessment criteria:

K2.1 Technical design and draughting communication:
- a. Who to report to.
- b. What to report.
- c. When to report it.
- d. How to report.

K2.2 Quality management procedures and the importance of following them.
- a. The importance of checking and confirming procedures have been followed and documentation is correctly completed.

K2.3 Why it is important to create and maintain working relationships.
- a. The importance of personal behaviour in maintaining workplace standards.
- b. The different problems that can affect working relationships and the actions that can be taken to deal with specific difficulties.

K2.4 The responsibilities and limits of a design and draughting technician in a typical workplace, the responsibilities of others within a typical work location and who to refer to for clarification of issues.

K2.5 The importance of reporting lines, procedures, systems and documentation and the consequences of failing to follow them.

K2.6 The project management life-cycle and how it impacts on design and draughting activities.

K2.7 Information and documentation systems – document control procedures for registering, storing and archiving drawings and

Skills assessment criteria:
The candidate must demonstrate the ability to:

S2.1 Check required design and draughting reporting is completed correctly once an activity is completed and before any handover takes place.

S2.2 Follow all relevant procedures as appropriate:
- a. Quality requirements.
- b. Ensure the work complies with Project Management procedures.
- c. Authorisation procedures.
- d. Complete all relevant documentation correctly and accurately at all stages.
- e. Report on the completion of activities for each design and draughting stage in accordance with procedures.

S2.3 Complete all relevant documentation correctly and accurately at all stages.

S2.4 Develop working relationships with a range of people:
- a. Deal with disagreements in a professional and constructive manner so that effective relationships are maintained.
- b. Keep others informed about work plans and activities which affect them – either formal/informal, written or verbal.
- c. If needed, seek assistance in relation to work related activities from others in a polite and courteous way without causing undue disruption to normal working activities.
- d. Respond in a timely and positive way when others ask for help or information e.g. prioritise requests,

documents
a. How to register and record designs.
b. How to store documentation and records.

K2.8 Data security – understand the critical nature of this function
a. Typical classification.
b. Protecting information.
c. Sharing information.
d. Confidentiality.

EMPLOYER DESIRABLE BEHAVIOURS

B2.1 Safety conscious - considers the implications of health, safety and environmental issues at all times.

B2.2 Effective communicator - works effectively with others including keeping others informed.

B2.3 Quality focus - ensure work is completed to an appropriate level of quality including attention to detail.

B2.4 Conscientious – follow procedures and completes documentation accurately and correctly and completes tasks on time.

B2.5 Initiative - deal with problems effectively and highlights those that cannot be solved.

B2.6 Ethical and environmental sustainability behaviours such as:
a. Manages risk to minimise adverse impact to people or the environment within the context of design and draughting.
b. Uses resources efficiently and effectively.
c. Treats all people fairly and with respect.
d. Accepts and promotes equality and diversity.
e. Is aware of bribery and security risks and escalation procedures.

B2.7 Learning agile – shows a willingness to learn new skills and is open to ideas and input from others.

B2.8 Innovative – displays the ability to think creatively, to research new ideas and consider/develop new ways of looking at things/generate solutions.

clarify exactly what is required.

S2.5 Ensure that communications with the customer (internal or external) meet typical organisational guidelines and procedures.

S2.6 Deal with problems appropriately if and when they arise.

S2.7 Provide information in an appropriate format using recognised and accepted conventions for terms and references.

S2.8 Work effectively by demonstrating appropriate behaviours.

Unit DD03 Understand the design requirements by interpreting technical information

Learning outcome:
The candidate must understand how to and be able to read and extract technical information from a range of documents.

Knowledge assessment criteria: The candidate must demonstrate an understanding of the following in order to satisfy the skills assessment criteria:	**Skills assessment criteria**: The candidate must demonstrate the ability to:
K3.1 The principles of design. K3.2 The design process. K3.3 Information sources and document systems. K3.4 Different types of technical drawings and specifications to which the candidate will be expected to work. K3.5 Convention, symbols and abbreviations used. K3.6 How to identify appropriate data within the drawings and specifications. K3.7 Importance of the content and accuracy relating to the documents: a. Assumptions and underpinning information needed. b. Locating relevant standards.	S3.1 Obtain the required technical information including: a. Technical drawings. b. Specifications. c. Concepts. d. Stakeholder requirements. e. Customer basis of design. S3.2 Check the validity of the documentation being used. S3.3 Correctly identify, extract and interpret information from technical drawings and functional specifications. S3.4 Review information against specification and ensure all essential information is present, current and valid. S3.5 Use the information obtained to ensure that work output meets the specification. S3.6 Ensure that customer technical, health and safety and environmental requirements are taken into account. S3.7 Resolve or report any inaccuracies or discrepancies in drawings and specifications.

Unit DD04 Identify, evaluate and understand factors affecting technical design	
Learning outcome: The candidate understands and is able to investigate and evaluate the factors that affect technical design.	
Knowledge assessment criteria: The candidate must demonstrate an understanding of the following in order to satisfy the skills assessment criteria: K4.1 Analysis methods and techniques. K4.2 Implications of legislation, regulations, standards and guidelines. K4.3 Structure and content of specifications. K4.4 Project management life-cycle and related costing considerations. K4.5 Quality considerations. K4.6 New and emerging technology, materials and techniques (relevant to the candidate's sector). K4.7 Methods for presenting information to the design team. K4.8 Production and manufacturing processes (relevant to the candidate's sector). K4.9 Environmental considerations. K4.10 Contractual considerations.	**Skills assessment criteria**: The candidate must demonstrate the ability to: S4.1 Research, obtain and prioritise information to identify factors likely to affect design. S4.2 Identify the factors that will affect design using appropriate methods. S4.3 Identify the impact of the project life-cycle on the design. S4.4 Evaluate and prioritise the factors that will affect design using appropriate methods. S4.5 Record and report the outcomes in a basis of design document in a format suitable for the stakeholder which could include: • Spreadsheets. • Drawings. • Calculations. • Sketches. • Schedules. • Model walkthrough.

Unit DD05 Generate creative engineering concepts and design options to solve technical challenges	
Learning outcome: The candidate understands the techniques and practices to create design options and uses them to produce potential solutions to a specific requirement.	
Knowledge assessment criteria: The candidate must demonstrate an understanding of the following in order to satisfy the skills assessment criteria: K5.1 Explain conceptual engineering challenges and design examples. K5.2 Innovation. K5.3 Where to find/learn about new ideas/best practice. K5.4 Creative and innovative brainstorming techniques. K5.5 Design techniques and methodologies for developing and analysing design options. K5.6 Cost control methods and techniques. K5.7 Complexities of customer requirements. K5.8 How design briefs are presented to the design team and the appropriate formats for recording design options.	**Skills assessment criteria**: The candidate must demonstrate the ability to: S5.1 Research relevant best practice and new thinking relevant to the technical challenge requirements. S5.2 Use a variety of creative techniques to generate ideas and engineering concepts to solve technical challenges. S5.3 Investigate an agreed range of design options. S5.4 Produce design options that meet customer requirements. S5.5 Confirm the technical feasibility and potential costs of each design option.

Unit DD06 Evaluate engineering design options to determine the most effective solution	
Learning outcome: The candidate understands and can evaluate engineering designs to determine the most effective solution.	
Knowledge assessment criteria: The candidate must demonstrate an understanding of the following in order to satisfy the skills assessment criteria: K6.1 Criteria used to assess and select a final technical design. K6.2 Design techniques and methodologies for evaluating design options. K6.3 Characteristics of materials and the relationship with the design.	**Skills assessment criteria**: The candidate must demonstrate the ability to: S6.1 Confirm and agree understanding of the design requirements. S6.2 Deal with any problems identified that relate to the design requirements and agree solutions. S6.3 Evaluate the design options given and identify which best meets the requirements/design specification for: a. Technical feasibility and detailed costs. b. Implications of health and safety and other relevant regulations and guidelines. S6.4 Produce, record and communicate detailed recommendations to the relevant people. S6.5 Ensure that the design option selected will work and is practical. S6.6 Prepare costings and timescales and ensure they are acceptable. S6.7 Prepare records for recommended design options. S6.8 Ensure the that the proposed design option(s) can be built, installed or manufactured and once commissioned, can be operated and maintained in a safe and cost-effective way.

Unit DD07 Complete engineering designs, produce and handover the final design package

Learning outcomes:

1. The candidate understands drawing methods and techniques and can produce detailed drawings and documents to relevant standards and codes.
2. The candidate understands the techniques and can create the final design package and hand it over for completion.

Knowledge assessment criteria:
The candidate must demonstrate an understanding of the following in order to satisfy the skills assessment criteria:

K7.1 Types and sources of technical information required for drawings, models and documents.
K7.2 Selection of data and features for inclusion in technical drawings or models.
K7.3 Drawing methods and techniques.
K7.4 Local/national and international standards, materials, formats, conventions and company procedures and practices for producing drawings or models.
K7.5 Procedures for:
  a. Checking, revising and recording of changes to drawings, models and documents.
  b. Drawing or model revisions and modifications.
  c. Clarification of technical queries
  d. Storage of technical information and drawings or models.
K7.6 Importance of the final design package and what it should include.

Skills assessment criteria:
The candidate must demonstrate the ability to:

S7.1 Review the technical information required to produce the detailed drawings or models to ensure the information is:
  a. Complete.
  b. Valid.
S7.2 Identify formats and conventions to use.
S7.3 Review the detailed requirements for the drawings.
S7.4 Produce drawings or models that are clear, concise and in line with local/national and international standards, materials, formats, conventions, company procedures and practices using an appropriate medium.
S7.5 Ensure drawings or models are checked and approved by the appropriate people within agreed timescales.
S7.6 Ensure drawings or models and related technical information are appropriately registered and stored securely.
S7.7 Complete any revisions and modifications needed in line with organisational procedures.
S7.8 Complete the design package within agreed timescales.
S7.9 Make a record of issues addressed in the development of the design.
S7.10 Ensure that designs are recorded and filed in accordance with company procedures.

3. Further information

For further information either visit the ECITB website or contact ECITB Awarding Organisation:

Tel: 01923 260000
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Website: www.ecitb.org.uk

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