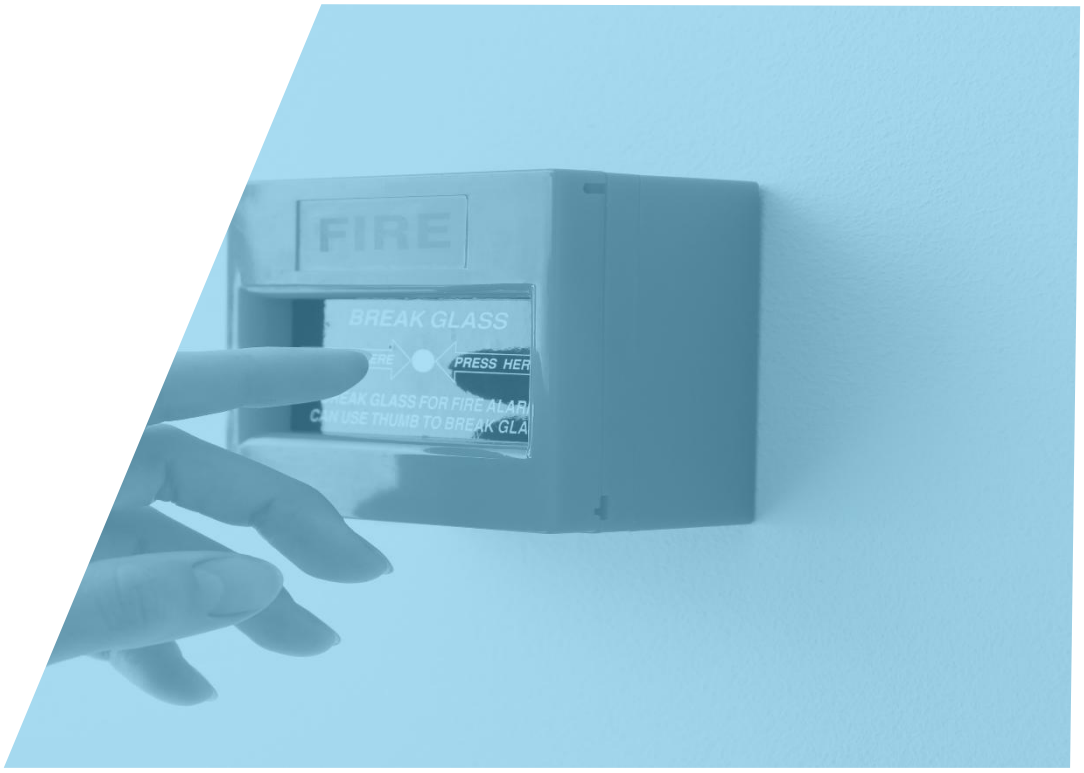
Qualification Specification

ProQual Level 5 Diploma in Fire Engineering Design

ProQual Level 5 Award in Fire Engineering Design



Scan Here

Contents

Introduction

The ProQual Level 5 Diploma in Fire Engineering Design and ProQual Level 5 Award in Fire Engineering Design provide nationally recognised qualifications for those currently working in auditing or risk assessing fire engineering design submissions, or undertaking research and development.

ProQual Level 5 Diploma in Fire Engineering Design and ProQual Level 5 Award in Fire Engineering Design are aimed at new or inexperienced fire engineers, building control officers, approved inspectors, fire safety auditors, inspectors, fire risk assessors, managers, surveyors, architects and other fire safety professionals so that they can work towards achieving a professional status such as the IFE Fire Engineering Graduate status or the Engineering Council Eng Tech level.

The aims of the qualifications are:

- To provides individuals with a practical understanding of fire engineering principles.
- To enable learners to apply proven techniques and procedures to assist with solving practical fire engineering problems.

The awarding body for this qualification is ProQual AB. The qualifications have been approved for delivery in England. The regulatory body for this qualification is Ofqual, and the qualifications have been accredited onto the Regulated Qualification Framework (RQF) and published in Ofqual's Register of Qualifications.

Qualification Profile

Qualification Title:	ProQual Level 5 Diploma in Fire Engineering Design
Qualification Number:	610/6991/7
Level:	5
Total Qualification Time (TQT):	372
Guided Learning Hours (GLH):	134
Assessment:	Pass/Fail
	Internally assessed and verified by centre staff
	Externally quality assured by ProQual Verifiers
Qualification Start Date:	01/02/2026
Qualification Review Date:	01/02/2029

Qualification Title:	ProQual Level 5 Award in Fire Engineering Design
Qualification Number:	610/6992/9
Level:	5
Total Qualification Time (TQT):	43-50
Guided Learning Hours (GLH):	14-21
Assessment:	Pass/Fail
	Internally assessed and verified by centre staff
	Externally quality assured by ProQual Verifiers
Qualification Start Date:	01/02/2026
Qualification Review Date:	01/02/2029

Learner Profile

There are no formal entry requirements although learners should be able to work at Level 4 or above and be proficient in the use of English Language. It would be advantageous, although not compulsory, to have completed the Level 4 Diploma in Fire Engineering.

Centres should perform an initial assessment of candidate knowledge and skills to identify any gaps and to help determine the assessment plan.

Candidates must be at least 18 years old on the day that they are registered with ProQual. Centres are reminded that no assessment activity should take place until a candidate has been registered.

Qualification Structure

ProQual Level 5 Diploma in Fire Engineering Design consists of **8 mandatory units**. Candidates must complete all mandatory units to complete this qualification.

ProQual Level 5 Award in Fire Engineering Design consists of **a minimum of one optional unit.** Candidates can select any of the units to complete this qualification.

Unit Number	Unit Title	Level	TQT	GLH
Candidates for the Diploma must complete **all** units in this group. Candidates for the Award must complete **at least one** unit in this group.				
D/651/9142	Principles of Fire Science for Fire Engineering Design	5	43	14
F/651/9143	Principles of Fire Engineering for Fire Engineering Design	5	50	21
H/651/9144	Review the Effectiveness of Automatic Fire Suppression Systems	5	50	18
K/651/9146	Fire Engineering Design of Means of Escape, Occupant Behaviour and Condition	5	50	18
M/651/9148	Fire Engineering Design of Materials, Elements of Structure and Structural Response to Fire	5	50	21
R/651/9149	Fire Engineering Design of Smoke Control and Ventilation Systems	5	43	14
A/651/9150	Fire Engineering Design of External Fire Spread and External Wall Systems	5	43	14
D/651/9151	Fire Engineering Design of Fire Service Intervention Strategies	5	43	14

Links to National Standards/NOS mapping

National Occupational Standards (NOS) are owned by a Sector Skills Council or Standard Setting Body and they describe the skills, knowledge and understanding needed to undertake a particular task or job at different levels of competence.

The Level 5 Diploma in Fire Engineering Design has been aligned with the **Engineering Council's UK Standard for Professional Engineering Competence and Commitment Contextualised for Higher-Risk Buildings (UK-SPEC-HRB: April 2025)**.

All Learning Outcomes and Assessment Criteria for this qualification have been mapped to the knowledge, competencies and legislation identified in the UK-SPEC-HRB to ensure a comprehensive and robust qualification that meets industry requirements.

Centre Requirements

Centres must be approved to deliver this qualification. If your centre is not approved to deliver this qualification, please complete and submit the **ProQual Additional Qualification Approval Form.**

Materials produced by centres to support candidates should:

- Enable them to track their achievements as they progress through the learning outcomes and assessment criteria.
- Provide information on where ProQual's policies and procedures can be viewed.
- Provide a means of enabling Internal and External Quality Assurance staff to authenticate evidence.

Centres must have the appropriate equipment to enable candidates to carry out the practical requirements of this qualification.

Certification

Candidates who achieve the requirements for all 8 units will be awarded:

- A certificate listing all units achieved, and
- A certificate giving the full qualification title:

ProQual Level 5 Diploma in Fire Engineering Design

Candidates who achieve the requirements for at least one unit will be awarded:

- A certificate listing all units achieved, and
- A certificate giving the full qualification title:

ProQual Level 5 Award in Fire Engineering Design

Claiming certificates

Centres may claim certificates for candidates who have been registered with ProQual and who have successfully achieved the qualification. All certificates will be issued to the centre for successful candidates.

Unit certificates

If a candidate does not achieve all of the units required for a qualification, the centre may claim a unit certificate for the candidate which will list all of the units achieved.

Please Note: Candidates wishing to complete single units as opposed to the full Diploma can register on the regulated Award in Fire Engineering Design and achieve for individual units.

Replacement certificates

If a replacement certificate is required a request must be made to ProQual in writing. Replacement certificates are labelled as such and are only provided when the claim has been authenticated. Refer to the Fee Schedule for details of charges for replacement.

Assessment Requirements

Each candidate is required to produce a portfolio of evidence which demonstrates their achievement of all of the learning outcomes and assessment criteria for each unit.

Evidence can include:

- Observation report by assessor.
- Assignments/projects/reports.
- Professional discussion.
- Witness testimony.
- Candidate product.
- Worksheets.
- Record of oral and written questioning.
- Recognition of Prior Learning.

Candidates must demonstrate the level of competence described in the units. Assessment is the process of measuring a candidate's skill, knowledge and understanding against the standards set in the qualification.

Centre staff assessing this qualification must be **occupationally competent** and qualified to make assessment decisions. Assessors who are suitably qualified may hold a qualification such as, but not limited to:

- ProQual Level 3 Certificate in Teaching, Training and Assessment.
- ProQual Level 3 Award in Education and Training.
- ProQual Level 3 Award in Assessing Vocational Achievement.
  (Suitable for assessment taking place in a simulated training environment only.)

Candidate portfolios must be internally verified by centre staff who are **occupationally knowledgeable** and qualified to make quality assurance decisions. Internal verifiers who are suitably qualified may hold a qualification such as:

- ProQual Level 4 Award in the Internal QA of Assessment Processes and Practice.
- ProQual Level 4 Certificate in Leading the Internal QA of Assessment Processes and Practice.

Occupationally competent means capable of carrying out the full requirements contained within a unit. **Occupationally knowledgeable** means possessing relevant knowledge and understanding.

Enquiries, Appeals and Adjustments

Adjustments to standard assessment arrangements are made on the individual needs of candidates. ProQual's Reasonable Adjustments Policy and Special Consideration Policy sets out the steps to follow when implementing reasonable adjustments and special considerations and the service that ProQual provides for some of these arrangements.

Centres should contact ProQual for further information or queries about the contents of the policy.

All enquiries relating to assessment or other decisions should be dealt with by centres, with reference to ProQual's Enquiries and Appeals Procedures.

Units – Learning Outcomes and Assessment Criteria

Title:	Principles of Fire Science for Fire Engineering Design			**Level:**	5
Unit Number:	D/651/9142	**TQT:**	43	**GLH:**	14

Learning Outcomes *The learner will be able to:*		**Assessment Criteria** *The learner can:*	
1	Understand how fire develops and spreads.	1.1	Explain the principles of fire development.
		1.2	Compare how fires are initiated and develop.
		1.3	Analyse the characteristics of an enclosure fire.
		1.4	Discuss physical factors that influence fire spread.
		1.5	Explain how environmental influences impact fire.
		1.6	Analyse the potential impact of urban and human environmental factors on fire development and fire spread.
		1.7	Discuss the products of combustion and how they may contribute towards fire spread.

Additional Assessment Information

This unit is **knowledge based.** This means that evidence is expected to take the form of candidate's written work and/or records of appropriate professional discussions.

Indicative Content

1.1: Behaviour and growth of fires, fire growth rates, time-based growth calculations. Building characteristics; dimensions, nature and geometry of construction, flashover, backdraft, neutral plane.

1.2: Fire load; type, location, arrangements and quantity of combustibles potential ignition sources. Sparks and Arcs, mitigation, L5 examples.

1.3: Enclosure; ventilation systems, unusual fire loads, tunnels.

1.4: Wall/ceiling linings, furniture and furnishings, building structure, live fire loads.

1.5: Environmental influences (internal); temperature, air movement, topography, humidity, weather, lightning, flooding, wildfires, tunnel fires, fuel controlled and ventilation-controlled fires.

1.6: Access to water supply, firefighting access and provision, wildfires, Modern Methods of construction, agricultural practices, biodiversity.

1.7: Ember generation, heat transfer, ventilation, routes to ignition, explosion, flashover.

Title:	Principles of Fire Engineering for Fire Engineering Design			**Level:**	5
Unit Number:	F/651/9143	**TQT:**	50	**GLH:**	21

Learning Outcomes *The learner will be able to:*		**Assessment Criteria** *The learner can:*	
1	Understand the importance of fire safety and fire engineering.	1.1	Analyse the events and causes of large historical fires.
		1.2	Conclude how these events could have been prevented.
2	Understand the principles of fire engineering design.	2.1	Explain the principles of fire engineering design frameworks.
		2.2	Explain detection and activation systems.
		2.3	Evaluate different evacuation strategies.
3	Understand the principles of fire modelling.	3.1	Explain the different methods of fire modelling.
		3.2	Compare the capabilities of different fire modelling systems.
4	Understand the use and purpose of guidance documents.	4.1	Interpret the most appropriate guidance documents for different scenarios.

Additional Assessment Information

This unit is **knowledge based.** This means that evidence is expected to take the form of candidate's written work and/or records of appropriate professional discussions.

Indicative Content

1.1: Selected case studies that include key learning points. Root cause analysis, Swiss Cheese model.

1.2: Reiterate causes of fire, prevention and mitigation activities, the engineering perspective.

2.1: BS 7974, Qualitative Design Review (QDR), analysis, deterministic studies, probabilistic risk assessment.

Design approaches, architectural design of building, fire safety objectives, hazards and possible consequences, case studies including key learning points.

2.2: Types of alarm system, types of detection systems, activation of alarm, fire protection systems, sprinklers, smoke venting, roller shutters, fire service notification, cause and effects e.g. smoke venting.

2.3: Re-cap evacuation types. Assess response of people to fire, evacuation time of occupants from any space within building, salvage, specialist e.g. hospitals, prisons, heritage buildings, retail premises, warehousing, airports, disability issues.

3.1: Zone and field models, suitability, limitations, justification, functional requirements of building regulations, physical, physical-statistical, statistical, and probabilistic fire prediction models.

3.2: Accuracy, efficiency, resource requirement (inc. processing power required) ease of use, cost, accessibility.

4.1: A range of scenarios/case studies

Range of guidance available and its application

Difference between guidance and regulation

Sources of information.

Title:	Fire Engineering Design of Automatic Fire Suppression Systems			**Level:**	5
Unit Number:	H/651/9144	**TQT:**	50	**GLH:**	18

Learning Outcomes *The learner will be able to:*		**Assessment Criteria** *The learner can:*	
1	Understand the principles of automatic fire suppression systems.	1.1	Summarise automatic fire suppression systems.
		1.2	Propose the suitability of automatic fire suppression systems for different levels of risk.
		1.3	Critique the advantages and disadvantages of automatic fire suppression systems.
2	Understand the guidance related to sprinkler systems.	2.1	Analyse the technical guidance relating to sprinkler systems.
3	Understand the methods for testing the levels of fire resistance of materials.	3.1	Summarise the technical guidance relating to oxygen reduction systems.
		3.2	Outline the principles of oxygen reduction systems.

Additional Assessment Information

This unit is **knowledge based.** This means that evidence is expected to take the form of candidate's written work and/or records of appropriate professional discussions.

Indicative Content

1.1: Categories of sprinkler systems, types of suppression systems, differences, water supplies, storage.

1.2: Guidance documents – ADB, 7974, LPCB Rules, 9999, 9991, BB100, HTM.

1.3: Vulnerabilities, compensatory features, Insurance requirements. Special circumstances.

2.1: Guidance documents – ADB, 7974, LPCB Rules, 9999, 9991, BB100, HTM, Residential and non-residential standards – 9251 (resi), EN 12845 (non-resi).

3.1: BS EN 16750.

3.2: Oxygen reduction, oxygen dilution (nitrogen).

Title:	Fire Engineering Design of Means of Escape, Occupant Behaviour and Condition			Level:	5
Unit Number:	K/651/9146	**TQT:**	50	**GLH:**	18

Learning Outcomes *The learner will be able to:*		**Assessment Criteria** *The learner can:*	
1	Understand the psychological and physiological effects of fire on human behaviour.	1.1	Justify the application of tenability limits.
		1.2	Identify the tenability criteria relevant to fire safety.
		1.3	Analyse the physiological impact of fire events on the human body.
		1.4	Analyse the psychological impact of fire events on human behaviour.
2	Understand how historic fire events have shaped knowledge of human behaviour.	2.1	Analyse how human behaviour is influenced by historical fire events.
3	Understand how fire engineering design impacts on human behaviour and Safe Egress Times.	3.1	Assess the impact of fire engineering design on human behaviour.
		3.2	Define the principles of Available Safe Egress Times (ASET) and Required Safe Egress Times (RSET).
		3.3	Review Available Safe Egress Times (ASET) and Required Safe Egress Times (RSET) calculations.

Additional Assessment Information

This unit is **knowledge based.** This means that evidence is expected to take the form of candidate's written work and/or records of appropriate professional discussions.

Indicative Content

1.1: PD7974. Where to find suitable tenability limits.

1.2: Threshold temperatures, toxicity levels, O2 levels, Visibility, fire load, PD7974.

1.3: Case studies. Fatigue, respiration/irritation, vision impairment, burns, hyperthermia.

1.4: Trauma, PTSD, Stress, Emotional distress, Panic, Depression, Effect of familiarity with the premises.

Research papers. E.g. "Escape behaviours in fires: Panic or Affiliation. Sime, JD (1984).

2.1: Appropriate case studies. Decision making process, risk evaluation, social pressures, Protective Action Decision Model (PADM), Conceptual Model of Evacuee Behavior (sic), WHAM! (Worldwide Human Activity Model).

3.1: Appropriate case studies. Evacuation modelling.

(Pathfinder) et al.

3.2: PD 7974-6

Exit routes, alarms, pre movement times, response time, movement/travel times, signage, emergency lighting, management, Fire Growth Rate, smoke movement, ventilation, suppression systems.

3.3: Scenario calculation review.

Title:	Fire Engineering Design of Materials, Elements of Structure and Structural Response to Fire			**Level:**	5
Unit Number:	M/651/9148	**TQT:**	50	**GLH:**	21

Learning Outcomes *The learner will be able to:*		**Assessment Criteria** *The learner can:*	
1	Understand the effects of fire on materials and structures.	1.1	Assess the effects of fire on materials.
		1.2	Evaluate, in relation to fire performance, the suitability of materials used for building structures.
2	Understand the methods for testing the levels of fire resistance of materials.	2.1	Critically analyse the different testing methodologies and results for fire resistance of materials.

Additional Assessment Information

This unit is **knowledge based.** This means that evidence is expected to take the form of candidate's written work and/or records of appropriate professional discussions.

Indicative Content

1.1: Testing, approval bodies. Reaction to fire, Fire resistance.

1.2: Design standards, Time Equivalence. Design choices, Structural fire engineering solutions.

2.1: Applications of fire resisting materials.

Title:	Fire Engineering Design of Smoke Control and Ventilation Systems			**Level:**	5
Unit Number:	R/651/9149	**TQT:**	43	**GLH:**	14

Learning Outcomes *The learner will be able to:*		**Assessment Criteria** *The learner can:*	
1	Understand smoke control and exhaust ventilation systems.	1.1	Explain the principles and objectives of smoke control and exhaust ventilation systems.
		1.2	Evaluate the technical guidance relating to smoke control and exhaust ventilation systems.
2	Evaluate the effectiveness of existing smoke control and exhaust ventilation systems.	2.1	Explain the design principles of smoke control and exhaust ventilation systems.
3	Determine the mass flow of smoke and temperature in smoke layers.	3.1	Determine the mass flow of smoke within a smoke layer.
		3.2	Determine the temperature within a smoke layer.
4	Design a smoke control and an exhaust ventilation system.	4.1	Generate design solutions for smoke control and exhaust ventilation systems.
		4.2	Explain the principles and objectives of pressure differential systems.

Additional Assessment Information

This unit is **knowledge based.** This means that evidence is expected to take the form of candidate's written work and/or records of appropriate professional discussions.

Indicative Content

1.1: Natural ventilation systems, mechanical ventilation systems, Firefighting operations, safe evacuation, design advantage. Means of escape vs Firefighting.

1.2: Functional requirements of Building Regulations, Approved Document B plus UK equivalents, BS 9999, BS 9991, BS 7974

Current industry guidance.

2.1: Calculation for natural ventilation systems, calculation for mechanical ventilation systems Number of extract points, areas of stagnation, plug holing, air inlet provision.

3.1: Smoke calculations – mass flow of smoke, air entrainment.

3.2: T Squared.

4.1: Types of system, occupancies, car parks, underground areas, shopping malls, atria, flats, smoke shafts, corridors, staircases.

4.2: Pressure differential systems, closed systems, BS EN 12101-6 Means of escape vs Firefighting.

Title:	Fire Engineering Design of External Fire Spread and External Wall Systems			**Level:**	5
Unit Number:	A/651/9150	**TQT:**	43	**GLH:**	14

Learning Outcomes *The learner will be able to:*		**Assessment Criteria** *The learner can:*	
1	Understand how fire engineering design impacts on the external spread of fire.	1.1	Explain the principles of space separation and the external spread of fire.
		1.2	Evaluate a simple space separation assessment using BR 187 or relevant calculation method.
2	Apply fire engineering design to the external spread of fire and meet functional needs.	2.1	Explain the effect of external spread of fire on materials.
		2.2	Assess the external spread of fire for a fire engineering design.
		2.3	Choose options to resolve non-compliance with Prescriptive Guidance in an example building.

Additional Assessment Information

This unit is **knowledge based.** This means that evidence is expected to take the form of candidate's written work and/or records of appropriate professional discussions.

Indicative Content

1.1: Radiation calculations, cladding, shielding, occupancy, CFD, terminology.

1.2: Use of tables, application of appropriate calculations, interpretation and use of plans.

2.1: Functional requirements of Building Regulations, Approved Document B (plus UK equivalents), BS 9999, BS 9991, BS 7974, BR187 or relevant national guidance.

2.2: Functional requirements of Building Regulations, Approved Document B (plus UK equivalents), BS 9999, BS 9991, BS 7974, BR187 or relevant national guidance.

2.3: Appropriate Case Studies, Functional requirements of Building Regulations, Approved Document B (plus UK equivalents), BS 9999, BS 9991, BS 7974, BR187 or relevant national guidance.

Title:	Fire Engineering Design of Fire Service Intervention Strategies			**Level:**	5
Unit Number:	D/651/9151	**TQT:**	43	**GLH:**	14

Learning Outcomes *The learner will be able to:*		**Assessment Criteria** *The learner can:*	
1	Understand how fire engineering design impacts on the access and facilities for firefighting.	1.1	Explain the access and facility requirements for firefighting.
		1.2	Evaluate how the facility requirements for firefighting will aid operations during a fire.
2	Apply fire engineering design to the access and facility requirements for firefighting.	2.1	Interpret appropriate guidance to validate the requirement for access and facilities for firefighting.
		2.2	Recommend options to resolve non-compliance in an example building.

Additional Assessment Information

This unit is **knowledge based.** This means that evidence is expected to take the form of candidate's written work and/or records of appropriate professional discussions.

Indicative Content

1.1: Functional requirements of Building Regulations, Approved Document B (plus UK equivalents), BS 9999, BS 9991, BS 7974, Local guidance,

Vehicle and fire-fighter access, fire-fighting shafts, stairs and lifts, water supplies, dry risers, wet risers, fire mains, communications, control centres, control systems.

1.2: Case study/simulation. Active systems (inc. suppression systems), PFP, Risers, Access, Smoke control, Control systems, Hydrant provision and alternate water supply. Hose Laying Distance, FF Shafts, FF Stairs. FF Lift.

2.1: Functional requirements of Building Regulations, Approved Document B (plus UK equivalents), BS 9999, BS 9991, BS 7974, local guidance.

2.2: Appropriate Case Studies, Functional requirements of Building Regulations, Approved Document B (plus UK equivalents), BS 9999, BS 9991, BS 7974, BR187 or relevant national guidance.

Appendix One – Command Verb Definitions

The table below explains what is expected from each **command verb** used in an assessment objective. Not all verbs are used in this specification

Apply	Use existing knowledge or skills in a new or different context.
Analyse	Break a larger subject into smaller parts, examine them in detail and show how these parts are related to each other. This may be supported by reference to current research or theories.
Classify	Organise information according to specific criteria.
Compare	Examine subjects in detail, giving the similarities and differences.
Critically Compare	As with compare, but extended to include pros and cons of the subject. There may or may not be a conclusion or recommendation as appropriate.
Describe	Provide detailed, factual information about a subject.
Discuss	Give a detailed account of a subject, including a range of contrasting views and opinions.
Explain	As with describe, but extended to include causation and reasoning.
Identify	Select or ascertain appropriate information and details from a broader range of information or data.
Interpret	Use information or data to clarify or explain something.
Produce	Make or create something.
State	Give short, factual information about something.
Specify	State a fact or requirement clearly and in precise detail.

ProQual Awarding Body
ProQual House
Unit 1, Innovation Drive
Newport, Brough
HU15 2GX

Tel: 01430 423 822
enquiries@proqualab.com
www.proqualab.com