GQA LEVEL 4 DIPLOMA IN FAÇADE TECHNOLOGY

Qualification Number

600/1458/1

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PERSONAL COMPETENCE SUMMARY

Name	Company/Centre
Job Title	GQA Registration Number

	UNITS OF COMPETENCE			ASSESSOR SIGNATURE Performance and knowledge assessment completed and supplemented with evidence overtime	DATE
Unit Number	**Mandatory Units**	**Level**	**Credit**		
FT1 H/503/0451	Understanding Health and Safety as Part of the Façade or Fenestration Planning Process	3	4		
FT2 K/503/0452	Theory of Windows and Doors	4	5		
FT3 T/503/0454	Theory of Curtain Walling	4	5		
FT4 F/503/0456	Wind Loads and Building Physics in Curtain Walling	4	5		
FT6 K/503/0466	The Use of Sealants in Curtain Walling	4	5		
FT7 J/503/0538	Building Energy and Thermal Values in Curtain Walling	4	5		
FT8 A/503/0536	Knowledge of Building Regulations and Legislation in Façades	3	5		
FT9 F/503/0540	Fixings in Façade Specifications	4	6		
FT14 F/503/0537	Produce Specifications for Curtain Wall Installations	4	6		
Optional Units – A minimum of 8 credits to be achieved					

RELIABLE EVIDENCE: The forms of evidence available include (mark as appropriate)

Observation in the workplace ☐
Records of prior experience ☐
Testimonial(s) ☐
Work records ☐
Assessment of knowledge ☐
Witness statement(s) ☐
Photographic evidence ☐
External testing ☐

Passport Style Candidate Photo (Mandatory)

COMPETENCE COMPLETION SIGNATURES

By signing here, the Candidate and Assessor confirm that evidence presented is authentic and that the assessments took place in accordance with the relevant assessment strategy. Details of the assessments and evidence must be recorded in the assessment decision record/summaries at the end of each unit.

	Name and Signature	Date
Candidate		
Lead Assessor		
Internal Verifier		
EQA		

Introduction to the Qualification

Who is this Qualification for?

This qualification is aimed at those who work as surveyors, designers, estimators or engineers working with Glass Façades.

This qualification is at Level 4, and should be taken by those who are experienced in this area, and are capable of dealing with the wide range of issues concerned with the design and specifications for Glass Façades, including working with installations that have complex requirements. Candidates will often take a technical supervisory role, particularly in relation to less-experienced members of the industry.
A further GQA Level 3 qualification in Fenestration Surveying is also available for those dealing with doors, windows and conservatories.

Candidates for this qualification will primarily be working on and could be assessed in the context of surveying, planning and estimating activities linked to the design, planning and specification production for Glass Façades.
Candidates could have jobs entitled:

- Surveyor
- Façade Technician
- Architectural Advisor/Assistant
- Project Manager
- Designer
- Estimator

What is required from candidates?

GQA qualifications are made up of a number of units that have a credit value or credits.

These credits must be achieved in the correct combination from mandatory and optional units: this qualification has 9 mandatory units and a group of optional units. Candidates should achieve all 9 mandatory units, plus a minimum of 8 credits from the optional units. This makes the minimum credit value of the qualification 54 credits.
The groups of optional units are intended to allow all those involved in the surveying, design and specification production for Glass Façades to achieve the full qualification: when choosing from the optional units it is important to ensure the units selected are appropriate and achievable within their job role.

These units are made up of the things a candidate needs to know and the things a candidate needs to be able to do to carry out the job role job safely and correctly. These are called Learning Outcomes, and all must be met to achieve the unit.

Unit ref	Title	Level	Credit
Mandatory Units			
FT1 H/503/0451	Understanding Health and Safety as Part of the Façade or Fenestration Planning Process	3	4
FT2 K/503/0452	Theory of Windows and Doors	4	5
FT3 T/503/0454	Theory of Curtain Walling	4	5
FT4 F/503/0456	Wind Loads and Building Physics in Curtain Walling	4	5
FT6 K/503/0466	The Use of Sealants in Curtain Walling	4	5
FT7 J/503/0538	Building Energy and Thermal Values in Curtain Walling	4	5
FT8 A/503/0536	Knowledge of Building Regulations and Legislation in Façades	3	5
FT9 F/503/0540	Fixings in Façade Specifications	4	6
FT14 F/503/0537	Produce Specifications for Curtain Wall Installations	4	6

Optional Units – A minimum of 8 credits to be achieved			
FT5	Knowledge of Glass Types, Properties and Uses	4	5
H/503/0465			
FT11	Unitised Façade Systems	3	3
L/503/0539			
FRG1	Principles of Fire-Resistant Glazing	3	5
L/502/9309			
FT13	Estimating and Specifying for Curtain Walling	4	7
J/503/0541			
FT10	Renewable Energy and Low/Zero Carbon Technologies in Curtain Walling	4	6
L/503/0542			

Achieving the combination of Mandatory units and the correct choice of Optional credits will mean the qualification has been completed and GQA will provide the Diploma with the qualification title. Where a candidate has completed additional credits the Diploma will list these as "additional credits", in cases where the candidate has not completed the full qualification and will not go on to do so, a Certificate of credit can be issued for the credits achieved.

Assessment guidance

Evidence should show that the candidate can complete all of the learning outcomes for each unit being taken.

Types of evidence:

This is primarily a knowledge based qualification; however it is possible that candidates will have evidence generated through their job role that can be used as evidence towards this qualification.

Evidence of knowledge can be demonstrated through completion of GQA approved assignments set by the Assessment Centre, by responding to questions, work produced as part of their job role and by the successful completion of tests and exams linked to training modules delivered by the Assessment Centre. The structure of the qualification means candidates must complete a minimum of 11 units, as part of the qualification requirements candidates must attend a minimum of 6 modules delivered by a GQA Approved Centre designed specifically around units within the qualification.

These primary types of evidence may also be supplemented by the following physical or documentary evidence:

- Accident books/reporting systems
- Safety records
- Calculations
- Installation and maintenance documentation
- Estimates
- Witness testimonies
- Correspondence with customer
- Telephone logs
- Project briefs
- Surveys
- Equipment
- Photographic/video evidence
- Notes and memos
- Evaluation reports
- Inspection reports

Quantity of evidence:

Evidence should show that the candidate can meet the requirements of the units in a way that demonstrates that the standards can be achieved consistently over an appropriate period of time. Due to the depth and range of knowledge required to complete the units it is expected that the average timescale for completion of this qualification is likely to be between 12 and 18 months, although this timescale is not definitive and may vary either way.

Please Note that photocopied or downloaded documents such as manufacturers' or industry guidance, H&S policies, Risk Assessments etc, are not normally acceptable evidence for GQA qualifications unless accompanied by a record of a professional discussion or Assessor statement confirming candidate knowledge of the subject. If you are in any doubt about the validity of evidence, please contact your GQA External Verifier.

GQA Qualification Implementation Requirements covering Centre Approval, Candidate Assessment and ongoing Quality Assurance

This document indicates the requirements of Approved Centres delivering GQA qualifications and / or units of credit.

1. Equality of Opportunity
Equality of access to fair and valid assessment is necessary for all candidates undergoing assessment. This may mean making reasonable adjustments to normal assessment methods for candidates with particular or special assessment requirements. Candidates work patterns should not become a barrier to assessment, the organisation of which may have to be flexible. In the same way, reasonable adjustment arrangements may be necessary for candidates with a disability. For example, a candidate who is unable, through disability, to produce oral or written evidence, may be allowed to use the method they normally use as a substitute for the required form of communication. Reasonable adjustments need to be approved by GQA.

2. Recognised/Approved Assessment Centres
2.1 Individual centres must be approved by GQA to offer specific qualifications and / or units of credit. A centre may be a single organisation or a partnership of two or more organisations. It may operate at a single location or have satellites. For further details see the GQA booklet "Guide to Centre Approval". The Centre Approval process is carried out by a GQA approved EQA. Each Centre must maintain a centre file. It is important to be clear what the steps in the assessment process are:
• plan evidence collection and opportunities for assessment
• collect evidence
• judge evidence
• determine whether sufficient evidence has been presented
• make an assessment decision and give feedback to the candidate

NB Any deviation from the norm must be approved by a GQA EQA

2.2 Assessors and Verifiers

All Assessors of candidate performance must be competent, to make qualitative judgements, both in the skills they are assessing and in the assessment of candidates and hold the appropriate Assessor national award. Assessor occupational knowledge related to the qualifications being assessed is essential and must be illustrated to GQA prior to approval.

Internal Verifiers are responsible for the quality assurance of the assessment process within a centre. They should have a relevant occupational background, be competent in internal verification and hold the Internal Verifier national award. It is recommended that Internal Verifiers work towards national recognition of assessor competence.

EQAs are responsible for ensuring accurate and consistent standards of assessment across centres, qualifications, units of credit and over time. They should have a relevant occupational background, be competent in external verification and hold the EQA national award
GQA will approve and licence all individuals involved in the assessment and verification of its approved qualifications and / or units of credit. Individuals who are working towards the Assessor or Internal Verifier national awards can only be provisionally licensed. The judgement of provisional licence holders will need to be agreed/authorised by a fully qualified and GQA licensed individual who cannot carry out a dual role in relation to a specific candidate.

All GQA Assessors and Verifiers must undertake a minimum of 2 significant CPD activities in both occupational areas and assessment and verification. Reflective CPD records must be maintained and made available to GQA EV's for review.

2.3 Centre Approval, Monitoring Reviews and Quality Assurance
The centre recognition/approval process is the start of a significant part of the awarding body's quality assurance system. The Approval process will begin with an EQA review of centre procedures to ascertain the potential centres ability to deliver GQA qualifications and / or units of credit. Centres will be expected to meet the relevant regulatory authority criteria for delivery of qualifications prior to initial approval; continued compliance with the criteria will be monitored through regular EQA visits. It is recommended that centre reviews are conducted at minimum every six months by a GQA EQA.

New or multi-site centres may be required to undertake quarterly or more frequent EV reviews to ensure that different locations can be seen to satisfy the national requirements.

GQA will ensure that unacceptable barriers relating to the assessment and internal verification of candidates in small companies do not deny recognition of competence to competent young workers. In such circumstances, GQA will demonstrate that its quality assurance procedures remain sufficient and rigorous to ensure that the competence outcomes have standing and credibility in the occupational area.

Enhanced quality procedures to ensure consistency of assessment and verification will be necessary and will include:
• a high level of sampling of assessment decisions N.B. In some instances the EQA may visit each assessment location and qualification / unit of credit candidate (e.g. single candidates dispersed throughout different small companies on government funded programmes)
• an in-depth scrutiny of assessment plans, materials and records
• specific centre guidance aimed at the successful implementation of qualifications and / or units of credit in SMEs via approved centre partnerships. This can include guidance on the quantity and quality of valid, authentic, and transferable evidence expected to be attributed to individual candidates
• ensuring centres are following the requirements prescribed in any appropriate assessment strategies and applicable codes of practice
• the identification and publication of good practice in centres

As part of the Quality Assurance process Proskills require an Enhanced External Verification process. This will be in the form of 1 significant underpinning knowledge question answered by the candidate for each unit of the qualification. The questions will be decided by GQA, and guideline answers must be submitted for approval and once approved kept in the Centre File to allow independent assessment

3. Qualification / Unit of Credit Candidates
All candidates must register with a GQA recognised/approved centre. The centre must maintain appropriate candidate personal details for external audit purposes etc.
The centre will provide candidates with advice and guidance on how to prepare for assessment and allocate an Assessor who will assess candidate ability to meet the requirements of the relevant qualifications / unit of credit. It is the candidate's responsibility to demonstrate competence and to do this they must:
• prove they can consistently meet all the qualification and / or unit of credit criteria
• provide evidence from work, that they can perform competently in all the contexts specified in the qualification / unit of credit requirements
• prove that they have the knowledge and understanding required to perform competently, even where they have not provided evidence from the workplace

It is therefore critical that quality evidence is provided in a format to allow the Assessor to make a decision and for the Internal Verifier to audit/verify his/her decision.

4. Evidence
A qualification and / or credit is awarded when a person has achieved the necessary outcomes of the qualification and / or unit of credit.
The specific combination of units necessary to achieve a qualification is detailed in the qualification structure. Certificates of Unit Credit can be awarded when candidates achieve any one, or more, units from the qualification.
The evidence the candidate brings forward is primarily evidence of performance of what he/she can do, not just what he/she knows. The assessment criteria / qualification requirements are described within the qualification and / or unit of credit itself and can incorporate practical skills and knowledge.
The assessor's role is to judge each relevant item of evidence. Each must be judged against the qualification and / or unit of credit requirements. It is not sensible to collect evidence against individual criteria. Nor is it effective. If items of evidence were collected for each of the criteria, the candidate may have to produce many items of evidence, well above the number actually required. GQA recommend holistic assessment.

When judging each item of evidence, the assessor is deciding whether the evidence:
• is authentic – i.e. actually produced by the candidate
• meets the criteria
• relates as appropriate to a context defined within the qualification and / or unit of credit
• confirms that the candidate has the required underpinning knowledge

When the assessor makes a decision about the candidate's competence, he or she examines all the evidence available to determine:
• if the evidence, as a whole, covers all the evidence of achievement
• whether the evidence indicates consistency in competent performance
• whether there is enough evidence on which to base an inference of competence
The answer can only be:
• yes (the candidate is competent)
• no (the candidate is not yet competent)
• there is insufficient evidence to make a decision

Consistency means that the individual is likely to achieve the standard in their work role, in the different activities defined in the qualification and / or unit of credit over time and range of work. The assessor must judge how long a time period is enough to be confident that the candidate can perform reliably to the standard. Unsupported evidence i.e. based on a single assessment/visit will not normally prove consistency.

Performance evidence
Performance evidence can be what the individual actually produces, or the way the individual achieves the standard. One is called product evidence and the other process evidence.
Product evidence is tangible – you can look at it and feel it. Products can be inspected and the candidate can be asked questions about them.

In order to make a fair and objective assessment, the assessor must be able to answer the question: Is there sufficient evidence that the candidate can consistently meet the requirements of the qualification and / or unit of credit?
Process evidence describes the way the candidate has achieved an outcome – how they went about it. This may be, for example, the way the quality of products is checked or the way customer complaints are handled. This usually means observing the candidate in action.

Performance evidence may cover a number of outcomes. It makes sense to plan evidence collection so that what the candidate does, in the normal course of their job, can be related to different outcomes and units. The activities that clearly link to the qualification and / or unit of credit requirements are the things to concentrate on when planning evidence collection and assessment and when monitoring the candidate's progress. Look for opportunities in the candidate's job when evidence can be collected against a number of units at the same time.

Performance evidence can be:
• Naturally occurring – evidence produced in the normal course of work. Evidence of this sort is usually of high quality and reliable. It is also cost effective to collect naturally occurring evidence
• Taken from previous achievements – the candidate may be able to bring forward evidence from previous work experience to show that they are still competent to the standard.
• Evidence of prior achievement can be used when it can be shown to support a judgment that the candidate can still achieve the standard. So, the assessor must be satisfied that the evidence of prior achievement is sufficiently reliable to justify saying that the candidate is currently competent.
• Simulated – from circumstances specially designed to enable the candidate's performance to be assessed. Simulation is generally not acceptable. The exceptions to this are:

o Dealing with emergencies
o Dealing with accidents
o Certain pre-approved real time simulators
o Limited other procedures that cannot be practically performed in the workplace, and for which sufficient evidence can be collected through other means.

NB:It is not always possible or feasible to collect naturally occurring evidence. It is likely that some simulation may be needed, when it may take too long to wait for the evidence to arise e.g. it may be an aspect of performance which occurs infrequently. An example of this may be evidence of how to deal with emergencies i.e. it makes sense to look for evidence from sources other than naturally occurring ones, rather than for, say, waiting for the building to burn down. Centres must obtain GQA EQA approval prior to the use of simulation.

Knowledge evidence
Being able to achieve a standard requires the ability to put knowledge to work. The qualification and / or unit of credit indicates the knowledge each person should use if they are to perform competently.
It should not be necessary to test all of the candidate's knowledge separately; however, any exception to this would be detailed in the relevant Assessment Strategy. Performance evidence could show that the candidate knows what he or she is doing. When this is not the case, or if the assessor is not convinced from the performance evidence, it may be necessary to check the individual's knowledge separately.

Oral or written assessments must clearly provide a suitable means of checking the breadth and depth of an individual's knowledge. Assessors will need to judge the best mix of knowledge evidence according to individual circumstances. Knowledge evidence is useful when deciding the quality of performance evidence, but must not be used in isolation to judge competence or as an alternative to performance evidence. Care must be taken that candidate evidence is auditable and verifiable.

NB: These Qualification implementation guidelines are generic across the full range of GQA qualifications. Further guidance on acceptable evidence on each qualification will be found in the Introduction to the Qualification section of the candidate booklet

Candidate Declaration

Candidate Name.....

Centre/Company Name.....

Assessor(s) Name(s).....

I acknowledge receipt of this copy of GQA qualification booklet. The unit structure provides information on which units must be achieved to be awarded the qualification. The individual units detail in the necessary requirements etc that I must achieve.
I understand that I will have an important role in preparing for and planning assessments and with guidance from the Assessor I will Collect and record relevant evidence.

I have been informed of the appeals system, should I want to appeal against any part of the assessment process.

I understand the assessments will be carried out with regard to the company's/centre's Equal Opportunities Policy.

Candidate signature.....

Date.....

Production/Process Activity Guideline

To aid new or established workers, a centre may wish to describe a normal production/process activity relevant to the achievement of the national vocational qualification and identify which units/elements it will contribute to, e.g. the act of preparation for work, implementation and completion will contribute to a number of units of competence.

Production/Process Activity Relevant to the Achievement of this Qualification	Contributory to: Units/Elements

FT1 H/503/0451	Understanding Health And Safety As Part Of The Facade Or Fenestration Planning Process	Level 3	4 Credits

The aim of this unit is to provide the learner with the knowledge of the health and safety matters involved within the façade or fenestration planning process, and includes knowledge of legislation and site visit procedures.

Learning outcome. The learner will:	Assessment criteria. The learner can:	Evidence.ref.no		
1. Know how to ensure designs comply with relevant health and safety regulations and legislation.	1.1 State which acts, regulations and guidelines need to be observed during the planning of façades and fenestration work.			
	1.2 Explain how these acts, regulations and guidelines apply to the façade and fenestration working environment.			
	1.3 Summarise which other individuals, Departments or organisations may need to be involved/consulted to ensure the compliance of designs with relevant health and safety regulations and legislation.			
	1.4 Give 2 examples of workplace conditions which may be exempt from the need to comply with regulations.			
2. Know how to monitor relevant changes in health and safety acts, regulations and guidelines.	2.1 Explain 3 methods to keep aware of relevant changes in health and safety acts, regulations and guidelines, to include: • Accessing HSE information • Receiving training updates			
	2.2 Critically compare the different methods in relation to: • Accuracy of information • Ease of access to up to date information • Supporting material			
3. Understand the types of hazards that have to be taken into consideration when planning façades and fenestration installations.	3.1 Summarise the hazards in the workplace concerned with people, materials, products, processes and equipment that need to be assessed.			
4. Understand the health and safety procedures to follow if a site visit is required.	4.1 Explain how to obtain information on the health and safety procedures to follow when making a site visit.			

Assessor comments/feedback

FT2	The Theory of Windows and Doors	Level 4	5 Credits
K/503/0452			

The aim of this unit is to provide the learner with the knowledge of windows, doors, fixings, relevant safety and other standards, also how corrosion can affect fittings and materials.

Learning outcome. The learner will:	Assessment criteria. The learner can:	Evidence.ref.no		
1. Understand how to define and identify a window.	1.1 Define a window in accordance with the British standards (BS) definition.			
	1.2 List 5 window types and describe the fitting systems normally used.			
	1.3 Distinguish the 5 window types drawn in accordance with the following notation standards: • BS 4873 • EN 12519			
	1.4 Summarise the potential implications of confusing the 2 window notation standards above.			
2. Understand how to define and identify a door.	2.1 Define a door in accordance with the BS definition.			
	2.2 Summarise EN 179 and EN 1125 and clarify which applies to the following: • Panic door • Emergency exit door			
	2.3 Define each of the following lock types: • Function B • Function D • Function E			
3. Understand the range and usage of window fittings available.	3.1 List 3 fittings used with windows and explain their purpose.			
	3.2 Summarise the considerations to be taken into account when specifying window fittings.			
	3.3 Distinguish between fittings on a standard window and a window to comply with the following: • BS 7950 • Secured by Design (SBD)			
	3.4 Differentiate between the safety issues for fittings on domestic and non-domestic windows.			

Assessor comments/feedback

FT2	The Theory of Windows and Doors (continued)	Level 4	5 Credits
K/503/0452			

4. Understand the range and usage of door fittings available.	4.1 List 3 fittings used with doors and explain their purpose.			
	4.2 Summarise the considerations to be taken into account when specifying door hinges with respect to: • Number of fittings • Type of fittings • Door function • Door design			
5. Understand how to evaluate the risk of corrosion with respect to window and door fittings.	5.1 Define corrosion.			
	5.2 Describe the conditions for corrosion to occur.			
	5.3 Evaluate the following materials with respect to corrosion: • Timber • PVCu • Aluminium • Steel			
	5.4 Describe a corrosion protection for each of the materials above.			
	5.5 Define the following: • Bi-metallic corrosion • Alkali corrosion • Atmospheric			
	5.6 Explain the consequence of incorrect specification of fixing screws for fittings.			

Assessor comments/feedback

FT3	Theory of Curtain Walling	Level 4	5 Credits
T/503/0454			

The aim of this unit is to provide the learner with the knowledge of a range of curtain wall systems, brackets, supports and gaskets. Knowledge of how environmental and weather conditions affect curtain walling will also be required to meet the unit aims.

Learning outcome. The learner will:	Assessment criteria. The learner can:	Evidence.ref.no		
1. Understand how to determine which curtain wall system should be used.	1.1 Explain the functional requirements of a curtain wall system with respect to: • Building regulations • Environmental issues • Security issues • Safety issues			
	1.2 Evaluate and prioritise the functions identified above to outline a system specification.			
2. Understand the factors determining the selection of a curtain wall system to suit the proposed building design/usage.	2.1 Describe 3 types of curtain wall system and evaluate the advantages and disadvantages of each.			
	2.2 Evaluate the reasons why one system type may be selected/preferred over another paying attention to: • Designed use • Site conditions environment • Ease of fabrication • Ease of installation • Future maintenance • Sustainability issues • Cost implications			
3. Understand how and why external influences and factors have an impact on curtain wall system designs.	3.1 Explain wind flow around a building and illustrate the effect adjacent structures may create.			
	3.2 Evaluate a curtain wall elevation with respect to possible rain intensity and explain effect of continual and prolonged exposure.			
	3.3 Explain 5 forces to be controlled by a curtain wall system.			
	3.4 Explain the effect that UV radiation can have on a façade.			
	3.5 Describe the different means by which water can penetrate a façade.			

Assessor comments/feedback

FT3 T/503/0454	Theory of Curtain Walling (continued)	Level 4	5 Credits

4. Understand the brackets and supports required for a curtain wall installation.	4.1 Clarify and illustrate the purpose of a curtain wall bracket with respect to: • Restraint • Support			
	4.2 Describe the adjustments required from a curtain wall bracketing system and why these may be required.			
	4.3 Evaluate and compare brackets for a hung system for: • Interlocking mullions • Independent support			
	4.4 Explain how the 'footprint' of the curtain wall bracket could induce additional loads and bending moments within a fixing and how to deal with these issues.			
	4.5 Explain how large spans between curtain wall brackets can induce large bending moments in fixings and how to deal with these issues.			
	4.6 Explain the importance of edge and axial spacing and how to review and revise load capacity of fixing after determining axial and edge spacing of fixings.			
	4.7 Explain how thermal expansion can induce loads with curtain wall system components, including: • How to identify coefficient of thermal expansion for materials within curtain wall • How temperature ranges that curtain wall is subjected to can have an effect • How to evaluate thermal expansion of critical components			
	4.8 Explain how to identify where thermal loss (cold bridging) could be a problem, and suggest ways to minimise the impact.			
	4.9 Describe one structural problem that could be caused by thermal loss.			
5. Understand the use of gaskets and gasket system in a curtain wall system.	5.1 Compare and justify the gasket material to be specified, explaining the final selection.			
	5.2 Analyse the glass/panels to be used in order to correctly identify a suitable gasket design based on: • Monolithic glazing • Double glazing • Panels • Window/Door inserts			
	5.3 Evaluate the advantages and disadvantages of supplying picture frame gaskets versus standard linear pieces, to include: • Storage requirements • Handling characteristics • Cost implications/design features			
6. Understand the functions of curtain wall edge details.	6.1 Analyse the different substrates around a curtain wall and evaluate the various solutions for an edge detail.			
	6.2 Explain how to maintain a drainage path out of a curtain wall interface.			
	6.3 List 3 possible problems with a curtain wall edge detail and provide a solution for each justifying the following: • Material cost • Labour cost • Ease of installation • Longevity			

FT4	Wind Loads and Building Physics in Curtain Walling	Level 4	5 Credits
F/503/0456			

The aim of this unit is to provide the learner with the knowledge of how wind loads can affect façades, the standards relating to wind loading and how to predict and calculate wind loads and associated information.

Learning outcome. The learner will:	Assessment criteria. The learner can:	Evidence.ref.no		
1. Understand the effects of wind loads on a façade.	1.1 Explain how wind loads are determined by BS 6399 part 2.			
	1.2 Identify and explain the different factors that can affect wind load at a given location.			
	1.3 Explain the common terms associated with wind load, and their effects on a façade: • Down draughts • Separation • Vortices • Funnelling • Wakes			
	1.4 Explain how complex angles and the addition of products such as Brise soleil can affect the loading on a façade.			
2. Understand how to identify the effects of wind loads.	2.1 Identify how wind loads can cause water ingress in a façade.			
	2.2 Summarise the effects for users of the building when the façade does not comply with BS 6399.			
3. Understand the building regulations and standards in force for wind loads.	3.1 List and compare the different standards that relate to wind loading in the UK.			
	3.2 Define which parts of the building regulations apply to façades/wind loads.			
4. Understand the range of methods for calculating wind loads.	4.1 Explain the three primary methods used to predict a building's wind load.			
	4.2 Explain all the factors you would have to consider to determine the thickness of the glass for a stated wind load.			
5. Understand the effect that loads, static calculations and construction methods have on the building envelope.	5.1 Explain the effect of deflection limits of a façade in relation to: • Structural anchors/brackets • Building construction method			
	5.2 Explain how to calculate wind loads that are: • Standard • Directional			

Assessor comments/feedback

FT6	The Use of Sealants in Curtain Walling	Level 4	5 Credits
K/503/0466			

The aim of this unit is to provide the learner with the knowledge of sealants available for use in curtain wall systems, how to identify and select the appropriate sealant and know how to deal with the issues concerned with a change of sealant.

Learning outcome. The learner will:	Assessment criteria. The learner can:	Evidence.ref.no		
1. Understand the sealants available for use in curtain walling.	1.1 List the types/groups of sealants used.			
	1.2 Explain the properties of each type listed.			
	1.3 Explain the limitations of each type, to include substrates in use.			
	1.4 Classify combinations that are not compatible and explain why.			
2. Know the difference between conventionally retained glazed façade and structurally bonded façades.	2.1 Explain what is meant by a conventionally/mechanically retained façade.			
	2.2 Explain what is meant by a structurally bonded façade.			
	2.3 Explain the key differences of the 2 systems.			
3. Understand the factors determining the selection of a type of sealant to suit the proposed building design and usage.	3.1 Justify the reasons why one type of sealant may be recommended over others, including the following specific areas: • Site conditions • Ease of use • Durability • Environmental issues • Climatic conditions • Cost implications • Required equipment			
	3.2 Evaluate and prioritise the issues identified above with regards to specifying sealants to be used.			
4. Understand what information is required before recommending a product not used before.	4.1 Classify the types of information required when considering the introduction of a change of product.			
	4.2 Summarise the possible implications of recommending a change of product.			

Assessor comments/feedback

FT7 J/503/0538	Building Energy and Thermal Values in Curtain Walling	Level 4	5 Credits

The aim of this unit is to provide the learner with the knowledge of building energy and thermal values, including U-values, window energy ratings, relevant building regulations and how ventilation and condensation play a part.

Learning outcome. The learner will:	Assessment criteria. The learner can:	Evidence.ref.no		
1. Understand the building efficiency requirements as introduced in 1990.	1.1 Interpret building efficiency requirements with respect to: • National/global initiatives • Energy consumption/generation • Building regulations			
2. Understand the need for thermal calculations in the design of buildings.	2.1 Summarise the latest version of Approved Document L (ADL).			
	2.2 Interpret the requirements of ADL with respect to: • Replacement windows and doors • New build window and doors • Curtain wall/façade systems			
3. Understand the formula and elements in the formula for carrying out a U-value calculation.	3.1 Define the 7 individual elements of the U-value formula.			
	3.2 Apply the U-value formula to a window type as listed: • Single pane • 2 pane • 3 pane			
	3.3 Apply the U-value formula to a section of curtain wall.			
4. Understand energy ratings with respect to windows and doors.	4.1 Explain the Window Energy Rating (WER).			
	4.2 Analyse the WER for different window systems and materials in order to offer design recommendations.			
	4.3 Evaluate WER versus U-value calculations to determine what is required for: • Domestic usage • Non-domestic usage			
5. Understand other building regulations to impact on energy considerations.	5.1 Summarise the other building regulations to impact on building energy considerations.			
	5.2 Analyse the impact implementation of other building regulations will have on the building energy rating.			
6. Understand system/unit ventilation.	6.1 Explain the 'dew point' and its relationship to condensation.			
	6.2 Explain how 'trickle vents' are handled in the thermal calculations of a window.			

Assessor comments/feedback

FT8 A/503/0536	Knowledge of Building Regulations and Legislation in Façades	Level 3	5 Credits

The aim of this unit is to provide the learner with the knowledge of relevant building regulations and how to interpret them. This includes safety glazing, fire safety, and energy efficiency. There is also the requirement to demonstrate an understanding of how to update knowledge in these areas.

Learning outcome. The learner will:	Assessment criteria. The learner can:	Evidence.ref.no		
1. Understand why building regulations and other statutory legislation exist, and where they apply.	1.1 Summarise the main purpose of the building regulations.			
	1.2 Explain which countries the building regulations apply to.			
	1.3 State the key parts of the building regulations that apply to curtain walling.			
	1.4 Interpret the key parts and summarise what they mean in practice.			
	1.5 State 2 pieces of legislation other than building regulations that apply to curtain walling and summarise what they mean.			
2. Understand when safety glazing must be used.	2.1 Define the term 'Critical Safety Area Locations'.			
	2.2 Explain when safety glazing must be used, to include: • Height from the finished floor level • Side panel distance from either edge of a door • Definition of 'finished floor level' • Which dimension to use if the ground level varies inside and outside • Explanation of where the drop on a stairway is measured from			
3. Know the specific aspects of fire resistant glazing covered by building regulations.	3.1 List the 4 main criteria of fire resistant glazing to achieve a safe structure in the event of fire.			
	3.2 Explain the requirements for windows provided for emergency egress purposes to include: • Minimum openable area • Minimum height and width • Maximum height from floor to the bottom of the openable area			
	3.3 Explain which rooms on the ground floor require egress windows to be installed.			
	3.4 Explain 2 factors that govern if the relevant building regulations applies to upper floors.			
4. Know the name and range of the UK's national system used for rating the energy efficiency of windows.	4.1 Identify the name and range of the UK's national system for rating the energy efficiency of windows.			
	4.2 State the minimum energy rating band acceptable in the building regulations.			

Assessor comments/feedback

FT8 A/503/0536	Knowledge of Building Regulations and Legislation in Façades (continued)	Level 3	5 Credits

5. Know how to keep knowledge of legislation and statutory requirements up to date.	5.1 Give 3 examples of the importance of keeping knowledge up to date, stating one benefit each for: • The Company • The individual • The customer			
	5.2 Explain 3 ways to keep informed of changes in legislation.			
	5.3 Critically compare each response to 5.2 with regards to: • Reliability of information • Cost effectiveness • Ease of understanding • Transfer of accurate information to other relevant persons			

Assessor comments/feedback

FT9	Fixings in Façade Specifications	Level 4	6 Credits
F/503/0540			

The aim of this unit is to provide the learner with the knowledge to interpret and understand the requirements for fixings in façade specifications. This will include knowledge of how the choice of fixings can be influenced by legislation, environmental issues, and the type of substrate. Knowledge of load capacity, brackets, fixings and equipment will also be required to complete the unit.

Learning outcome. The learner will:	Assessment criteria. The learner can:	Evidence.ref.no		
1. Understand the factors to be considered in order to determine the fixings required for the project.	1.1 Clarify the requirements of fixings within a curtain wall with respect to: • Building regulations/Relevant Approvals • Environmental issSecurity issues • Safety issues • Weather/Environmental conditions			
	1.2 Evaluate and prioritise the issues identified in 1.1.			
2. Understand different types of substrates and how they affect fixing selection.	2.1 Explain how to evaluate critical aspects of the building substrate, with respect to: • Classify concrete as cracked or non-cracked • Determine substrate depth • Determine compressive strength of substrate • Diagnose if 'saponification' could be a design issue			
	2.2 Develop and justify a specification for fixings.			
3. Understand environmental performance characteristics required from the fixing.	3.1 Explain how to establish performance requirements for fixing with respect to environmental factors, for example: • How to determine the required metallic finish of the fixing with respect to the corrosive level of the surrounding environment • How to establish level of fire protection required			
4. Understand imposed loads applied to the fixings.	4.1 Explain how to identify the direction and magnitude of loads that the fixings will be subjected to, for example: • Establish tensile load and shear loads applied to fixing • Calculate resultant load on fixing • Identify if loads are static or variable/dynamic • Differentiate between design, recommended and ultimate loads • Differentiate between factored and unfactored loads			
5. Understand how to evaluate fixing capacity with respect to loads applied.	5.1 Explain the calculations or design software used to evaluate suitability of the fixing.			
	5.2 Explain how to perform unity checks on the fixing capacity.			
	5.3 Explain how to critically compare and apply partial/ global safety factors.			

Assessor comments/feedback

FT9	Fixings in Façade Specifications (continued)	Level 4	6 Credits
F/503/0540			

6. Understand the factors determining the selection of a type of curtain wall fixing to suit the proposed building design/usage.	6.1 Critically compare 3 types of fixings, evaluating the advantages and disadvantages of each.			
	6.2 Justify the reasons why one fixing type may be selected/ preferred over another paying attention to: • Site conditions • Ease of installation • Future maintenance • Environmental issues • Cost implications			
7. Understand the brackets and supports required for a curtain wall installation.	7.1 Explain and illustrate the types and purpose of curtain wall brackets available with respect to: • Restraint • Support			
8. Know the equipment required to use with fixings.	8.1 Classify 4 different pieces of equipment that can be used to install fixings.			
	8.2 Critically compare manual and power equipment used in fixings.			

Assessor comments/feedback

FT14 F/503/0537	Produce Specifications for Curtain Wall Installations	Level 4	6 Credits

The aim of this unit is to provide the learner with the knowledge to be able to produce accurate specifications for the installation of Curtain Wall systems, using text and graphical information and analyse the effectiveness of the completed specifications, and know how to deal with the findings of the analysis.

Learning outcome. The learner will:	Assessment criteria. The learner can:	Evidence.ref.no		
1. Understand the information required to produce curtain wall specifications and how to obtain it.	1.1 Describe the types of information required to produce accurate specifications.			
	1.2 Explain the primary source of information.			
	1.3 Classify additional sources of information.			
2. Know how to determine curtain wall specifications.	2.1 Describe the types of detail that should be included in a specification.			
	2.2 Describe the appropriate level of detail that is required in a specification.			
	2.3 Explain how to analyse whether a specification is capable of being achieved.			
	2.4 Describe the regulations and guidelines that need to be considered in specifications and their implication.			
	2.5 Explain the purpose and benefits of developing objective selection criteria.			
	2.6 Explain the purpose and benefits of prioritising requirements.			
	2.7 Explain how to consult with a client on a specification, and when it is most appropriate.			
3. Understand how to deal with changes to specifications.	3.1 Describe the types of changes to specifications that could be necessary and how these can become apparent.			
	3.2 Explain how to identify alternatives when it is necessary to make changes to specifications.			
	3.3 Explain the situations requiring changes to specifications that are beyond own limits of authorisation and the Company procedures for dealing with them.			
	3.4 Summarise the reasons that the Company procedures should be followed.			
4. Understand how to determine the appropriate systems to use to produce and record the specification.	4.1 Classify the different formats used for specifications.			
	4.2 Explain how to determine which format is most appropriate.			
	4.3 Summarise the supporting documentation that may be required with specifications.			
	4.4 Explain the meaning and purpose of document control.			
	4.5 Explain how to ensure that the content of the graphical technical information is accurate, clear and complete.			
	4.6 Explain the Company procedures for distributing and storing details of the specification.			

Assessor comments/feedback

FT14 F/503/0537	Produce Specifications for Curtain Wall Installations (continued)	Level 4	6 Credits

5. Understand how to evaluate the effectiveness of the specification.	5.1 Explain the information required to evaluate the effectiveness of the specification, to include: • Type of information • Source of information • When to obtain it			
	5.2 Explain how to use the information to evaluate the effectiveness.			
	5.3 Explain how to review and prioritise the findings.			
	5.4 Explain how to use the findings to help decide if the specification: • Was an overall success • Can be used as a 'template' for future specifications • Is not viable in future similar projects			
	5.5 Describe the Company procedure to ensure relevant persons are made aware of the analysis and recommendations.			

Assessor comments/feedback

FT5	Knowledge of Glass Types, Properties and Uses	Level 4	5 Credits
H/503/0465			

The aim of this unit is to provide the learner with the knowledge of a wide range of glass types and their uses and properties. The glass types include laminated, toughened, solar and fire-resistant glazing. Knowledge of cosmetic and decorative glass and films is also required.

Learning outcome. The learner will:	Assessment criteria. The learner can:	Evidence.ref.no		
1. Know the difference between laminated and toughened glass.	1.1 Describe the typical make up of laminated glass.			
	1.2 Explain in detail how toughened glass is manufactured.			
	1.3 Describe how laminated glass normally behaves on impact and what protection this gives.			
	1.4 Describe how toughened glass normally behaves on impact and what protection this gives.			
	1.5 Describe what processes can be carried out on laminated glass after manufacture.			
	1.6 Describe what processes can be carried out on toughened glass after manufacture.			
	1.7 Critically compare laminated and toughened glass giving 2 examples of where and why one should be used over the other.			
2. Know the properties of Polyvinyl Butyral (PVB) interlayers used in laminated glass manufacture.	2.1 Describe the properties of Polyvinyl Butyral (PVB) interlayers used in laminated glass manufacture.			
	2.2 Explain how the PVB interlayer differs from the norm on acoustic glass.			
3. Know how solar control glass is constructed, what its uses are and how it works.	3.1 Explain how solar control glass is constructed.			
	3.2 Explain how solar control glass works.			
	3.3 Give 3 examples of uses for solar control glass.			
4. Understand the terminology used in reference to solar control glass.	4.1 Define the following: • Low-emissivity glass • Reflectance • Absorptance • Direct transmittance • Total transmittance			
5. Understand what is meant by safety glazing.	5.1 Explain the types of glass used in safety glazing, to include: • The requirements of safety glazing with regard to impact • The requirements of safety glazing with regard to containment of glass and/or people			
	5.2 Explain where to obtain up to date information on the legislation and regulations for safety glazing.			
6. Know the difference between fire-resistant glazing and standard glazing.	6.1 Explain 3 different requirements between fire-resistant glazing and standard glazing.			
	6.2 Describe 3 types of fire resistant glazing.			
	6.3 Explain 2 other components that affect the efficiency of fire resistant glass.			
7. Understand the terminology used in fire-resistant glass.	7.1 Explain the meaning of the following: • Performance specification • Integrity • Integrity with insulation • Intumescent seals			
8. Know the purpose and meanings of glass marking.	8.1 Explain the purpose of glass marking.			
	8.2 Explain 3 pieces of information that must be clearly and indelibly present on safety glass.			
	8.3 Explain 2 other pieces of information that is often found on glass.			

FT5	Knowledge of Glass Types, Properties and Uses (continued)	Level 4	5 Credits
H/503/0465			

9. Understand different types of glass and their properties.	9.1 Explain the meaning and make up of 2 of the following: • Acoustic glazing • Electrochromic glazing • Self cleaning glass			
10. Understand how thermal glazing works.	10.1 Describe the purpose of thermal glazing.			
	10.2 Describe 3 ways that thermal efficiency can be improved.			
11. Know the name and range of the UK's national system used for rating the energy efficiency of windows.	11.1 Identify the name and range of the UK's national system for rating the energy efficiency of windows.			
	11.2 State the minimum energy rating band acceptable in the Building Regulations.			
12. Know the optimum space for heat retention between 2 panes of glass in a double glazed unit.	12.1 State the optimum space for heat retention between 2 panes of glass in a double glazed unit.			
13. Know the types and benefits of glazing units that can help meet the requirements of Part L of the Building Regulations.	13.1 Name 2 types of glazing unit other than 'traditional' double glazed units that can help meet the requirements of Part L of the Building Regulations.			
	13.2 Explain the benefits of each of the 2 types named.			
14. Know the types of decorative glass and cosmetic processes available.	14.1 Describe 3 types of decorative glass that can be used to create different visual effects.			
	14.2 Describe the possible benefits of using decorative glass.			
	14.3 Describe the possible disadvantages of using decorative glass.			
15. Understand the use of films in glazing.	15.1 List 3 different types of films available for use in glazing.			
	15.2 Give 5 examples of ways films can be used.			
	15.3 Describe the properties and method of application of each type of film listed.			
	15.4 Explain 3 advantages of using film.			
	15.5 Explain 3 disadvantages of using film.			
16. Know how to obtain information on glass and glazing.	16.1 Name the specific part of the Building Regulations that applies to glass and glazing.			
	16.2 Name 3 other sources of information that can be obtained on glass.			
	16.3 Critically compare the reliability of each source of information named in 16.2.			

Assessor comments/feedback

FT11	Unitised Façade Systems	Level 3	3 Credits
L/503/0539			

The aim of this unit is to provide the learner with the knowledge of unitised systems, the benefits and limitations of this type of system, also knowledge of problems, cost implications and maintenance issues are required to meet the unit aims.

Learning outcome. The learner will:	Assessment criteria. The learner can:	Evidence.ref.no		
1. Understand the factors that determine the selection of a unitised system.	1.1 Explain the advantages, to the installer, of using a unitised system on a building.			
	1.2 Describe the limitations of a unitised system.			
	1.3 Explain the benefits of unitised façades purely from a customer perspective.			
2. Understand the principles involved in the design and fabrication.	2.1 Explain why they would specify unitised over a 'stick' curtain wall in terms of a quality perspective.			
	2.2 Explain 3 problems that can be encountered in the fabrication factory with this type of system.			
3. Understand the principles involved in the installation of a unitised system.	3.1 Explain in detail the factors that affect the installation, including: • Gaskets • Sealants • Brackets • Lifting rigs • Building tolerances • Weather • Other trades			
	3.2 Explain how to analyse the cost implications of installing unitised compared to 'stick' curtain wall.			
4. Understand the performance of a unitised system.	4.1 Critically compare the maintenance needs of a unitised system compared to a 'stick' curtain wall.			

Assessor comments/feedback

FRG1	Principles of Fire Resistant Glazing	Level 3	5 Credits
L/502/9309			

The aim of this unit is to provide the learner with the knowledge and skills to understand the basic principles of fire resistant glazing so as to be able to accurately assess the requirements of the fire resistant glazing installation and to be able to prepare a plan for carrying out the work.

Learning outcome. The learner will:	Assessment criteria. The learner can:	Evidence.ref.no		
1. Know the difference between fire resistant glazing and standard glazing.	1.1 Explain 3 different requirements between fire resistant glazing and standard glazing.			
2. Understand the types of fire resistant glazing available.	2.1 Name the 2 types of fire resistant glazing.			
	2.2 Explain the differences between the 2 types.			
	2.3 Name the 2 test criteria that are used to classify fire resistant glazing.			
	2.4 Explain how fire performance is measured.			
	2.5 Explain how fire performance is typically expressed.			
3. Understand the legislation on fire resistant glazing and how to apply them in practice to the glazing work to be carried out.	3.1 Explain the overall aims of the fire resistant glazing regulations.			
	3.2 Explain where to get detailed information on the fire resistant glazing regulations.			
	3.3 Explain how to confirm the work will be carried out in accordance with legislation.			
4. Know the basic principles of fire containment in buildings.	4.1 Explain the basic principles of fire containment in buildings, for example: • Compartmentation • Fire resistant doors and apertures • Means of escape			
5. Know the factors that can have an effect on the performance of fire resistant glazing.	5.1 List 6 of the key factors that influence the fire resistance of a glazing system.			
6. Know how the different components in the fire-resistant glazed system react under fire conditions.	6.1 Explain how the different components of the fire resistant glazed systems will react under fire conditions, to include: • Expansion • The supporting structure • Fixings to the supporting structure • Fire stopping between the glazed system and the surrounding structure			
7. Know which systems or applications require special considerations when using fire resistant glass and know why special considerations may be necessary.	7.1 Name 3 systems or applications which could require special considerations when using fire resistant glass.			
	7.2 Explain why each of the above systems or applications may need special considerations to ensure fitness for purpose in the event of fire.			
8. Know how to ensure the specified system is appropriate for the installation.	8.1 Name 3 ways of ensuring the system is fit for purpose.			
	8.2 Explain how each one is carried out and what is covered.			

Assessor comments/feedback

FRG1 L/502/9309	Principles of Fire Resistant Glazing (continued)	Level 3	5 Credits

9. Know the type of problems that can occur in the preparation of fire resistant glazing and how to resolve them.	9.1 Describe 3 problems that can occur in the preparation of fire resistant glazing and explain how these might be overcome.			
10. Know how to record information on the preparation of fire resistant glazing to comply with Organisational and manufacturer's guidelines and legislation.	10.1 Explain the systems in place for recording information on the preparation of fire resistant glazing.			
	10.2 Explain how these recording systems ensure compliance with Organisational and manufacturer's guidelines and legislation.			

Assessor comments/feedback

FT13 J/503/0541	Estimating and Specifying for Curtain Walling	Level 4	7 Credits

The aim of this unit is to provide the learner with the knowledge to be able to convert design briefs to workable specifications and produce accurate estimates. Knowledge of how to balance operational practicalities with legislation is also required. The depth of knowledge must be sufficient to know how to recognise when variations are necessary and how to propose them. Finally there is the need to be aware of problems and be able to suggest solutions.

Learning outcome. The learner will:	Assessment criteria. The learner can:	Evidence.ref.no		
1. Know how to specify a detailed design solution along with a financial estimate.	1.1 Explain how to convert a design brief to an accurate design specification and estimate including: • Overall system(s) to be used • Individual components • Fabrication recommendations • Installation recommendations			
	1.2 Justify the selections made above with respect to: • System performance versus design requests • Component costs • Fabrication costs • Installation costs • Site requirements			
2. Understand the various design/ specification options available in a range of systems.	2.1 Select a system to be specified based on design requirements versus operational requirements to meet current building legislation.			
	2.2 Offer and justify an alternative selection based on: • Ease of fabrication • System performance • Cost • Ease of installation • System lifespan • Sustainability • Ethical sourcing			
3. Understand why design variations may be needed and how to propose them.	3.1 Explain when the need for a design variation/deviation may arise.			
	3.2 Evaluate the implications of any variations on the following: • Programme/scheduling • Resource allocations • Site layout • Other trades • Costs			
4. Understand the problems that can occur with producing estimates.	4.1 Describe 3 typical problems that can make estimating difficult.			
	4.2 Explain how to overcome the problems identified.			

Assessor comments/feedback

FT10 L/503/0542	Renewable Energy and Low/Zero Carbon Technologies in Curtain Walling	Level 4	6 Credits

The aim of this unit is to provide the learner with the knowledge of systems and technologies available in renewable energy and low/zero carbon technology for use in curtain wall systems. It also includes knowledge of how to calculate the return on investment from systems and other associated issues.

Learning outcome. The learner will:	Assessment criteria. The learner can:	Evidence.ref.no		
1. Understand the basic low/zero carbon technologies and systems available with respect to building design.	1.1 Describe 4 x low/zero carbon technologies and summarise any advantages and disadvantages.			
	1.2 Evaluate the 4 x low/zero carbon technologies and justify their integration into a building design.			
2. Understand the purpose of a building integrated renewable energy system in commercial buildings.	2.1 Describe a basic layout and criteria for a building integrated renewable energy system.			
	2.2 Justify the specification of a building integrated renewable energy system evaluating the gains versus cost.			
3. Understand add-on renewable energy systems to existing buildings.	3.1 Describe how modern low/zero carbon technologies can be integrated into older less modern buildings.			
	3.2 Evaluate the commercial impact of incorporating a low/zero carbon technology into an existing building covering: • Building occupancy • System cost vs. building value • Disruption to building use			
4. Understand how to calculate the Return On Investment (ROI) when using low/zero carbon technologies.	4.1 Explain how to calculate the payback vs. cost of each system to be incorporated, to include for example, tariffs and incentives.			
	4.2 Explain the factors that can reduce the efficiency of systems and how to minimise the impact on efficiency and ROI.			
	4.3 Justify other aspects of the systems: • Carbon footprint • Sustainability • Product sourcing			

Assessor comments/feedback

Notes

Notes

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